

# Standards of Cover

# **SIERRA FIRE PROTECTION**

# **DISTRICT**



Prepared by:



101 Parkshore Drive, Suite 100  
Folsom, California 95630

The All Risk Standards of Cover was produced under the direction of the Washoe County Nevada County Commissioners, Washoe County Manager Katy Simon and Washoe County Fire Service Coordinator Kurt Latipow



The All Risk Standards of Cover compiled by  
Diamante Partners



101 Parkshore Drive, Suite 100  
Folsom, California 95630

**We gratefully acknowledge the assistance of:**

Washoe County Planning Department

Washoe County Geographic Information Systems

Washoe County Community Development

Sierra Fire Protection Staff Officers

Reno Fire Department Staff Officers

Marty Scheuerman

Mary C. Walker, CPA

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REMSA Regional Emergency Medical Services Authority

Susan Hood, Department of Water Resources

ECOMM (Reno and Washoe County 911)

Washoe County Fire Coordinator

Washoe County Manager

Washoe County Volunteer Fire Agencies

The County of Washoe Requested in its RFP2662-09 the following scope of work:

12.1.3 Conduct a Standards of Response Cover Deployment Analysis. This approach uses risk and community expectations on outcomes to assist fire department leadership and elected officials in making informed decisions on fire and EMS deployment levels. The Standards of Response Cover process consists of eight parts:

1. Existing deployment- each agency has something in place today
2. Community outcome expectations-what is expected of the response agency
3. Community risk assessment- what assets are at risk in the community
4. Critical Task Time Study- what must be done over what time frame to achieve the stated outcome expectation(s).
5. Distribution Study- the location of first-due resources
6. Concentration Study-first alarm assignment or effective response force
7. Reliability & Historical response effectiveness studies-using prior response statistics to determine what percent of compliance the existing system(s) deliver
8. Overall evaluation-proposed standard of cover statements by risk type. Identify and prioritize critical deficiencies. Answer the question of what we need to do for the future.
9. Add item- Address future delivery system models including governance options as they may relate to the eight (8) previous questions

Diamante Partners have responded and offered the following solution:

### **Standards of Cover Deployment Analysis: Methodology and Approach Summary**

#### **Goal:**

*Fire Protection and Emergency Medical Delivery Systems are based on an acceptable risk. The focus of the Standards of Cover (SOC) study for Washoe County that will be conducted by **Diamante Partners LLC** will be to ensure that necessary community stakeholders and elected officials have the opportunity to make informed decisions on what that acceptable risk is and accordingly determine the distribution and concentration of fixed and mobile resources of designated fire and EMS organizations.*

#### **Our Approach:**

The Diamante Team will conduct a series of face-to-face community/regional meetings as well as incorporate the use of a web based survey tool to gather input from community stakeholders on expectations of service delivery, given different variables or scenarios. Data collected as a result of this outreach will serve as a valuable tool for elected officials to help them determine priorities for the future. The study will evaluate the eight major components of a SOC utilizing national, state and local standards. Information and guidelines (*risk, department decisions, resource distribution, concentration, and staffing of line companies, etc*) set forth by the following organizations will be reviewed and incorporated into the study:

- 1 International Association of City Managers and the International Association of Fire Chiefs, Commission of Fire Accreditation International (CFAI) ;
- 2 National Fire Protection Association (NFPA);
- 3 Insurance Services Organization (ISO);
- 4 International Code Council (ICC), fire and life safety codes; and,
- 5 Occupational Safety and Health Agency (OSHA) standards
- 6 NRS 474

The SOC will serve as a baseline for the current condition of the Fire Protection and Emergency Medical Delivery System. The Diamante Team will ask that local officials' adopt the final SOC by ordinance, to establish each jurisdiction "standards". This adds a layer of protection to each jurisdiction for liability purposes and will allow a platform to analyze the cost of fire protection and emergency medical services and an opportunity to determine how to methodically improve the system. A SOC is a critical component (baseline) for a master plan.

**Our Methodology:**

In the development of the SOC Study, the Diamante Team will utilize a "systems" approach to deployment rather than a one-size-fits all prescriptive formula. In a comprehensive approach, each agency should be able to match local need (risks and expectations), with the costs of various levels of service. In an informed public policy debate, each level of governing board "purchases" the fire and EMS protection (insurance) the community needs and can afford.

All Eight Components of Standards of Cover Systems will be addressed:

- 1 Existing deployment
- 2 Risk identification
- 3 Risk expectations
- 4 Service level objectives
- 5 Distribution
- 6 Concentration
- 7 Performance and reliability
- 8 Overall evaluation

**Existing Deployment Policies**

All agencies have existing policies, even if they are undocumented or adopted by the locally responsible elected officials. Originally, stations and equipment were located to achieve certain expectations. Diamante will look at how and why policies were developed and resources placed to gain historical perspective and an understand and described and contrasted to any proposed changes.

**Building Risk Identification and Assessment**

Diamante will build a Risk Identification and Assessment consisting of three elements:

- **Fire Flow:** The amount of water to control the emergency, which is based on structure, contents and exposures.
- **Probability:** The likelihood that a particular event will occur within a given Period of time or over a period of time.
- **Consequence:** Includes two components - Life Safety (the amount of emergency personnel and equipment to rescue or protect the lives of an occupant from life threatening situations); and Economic Impact (the losses of property, income or irreplaceable assets).

**Building Risk Assessment is performed at three levels of measure:**

- **Occupancy Risk:** Diamante will make an assessment of the relative risk to life and property resulting in a fire inherent in a specific occupancy or in a generic occupancy class.
- **Demand Zone:** An area used to define or limit the management of a risk situation. A Demand Zone can be a single building, or a group of buildings. It is usually defined with geographical boundaries and can also be called fire management areas or fire management zones. Sometimes Demand Zones are a department's data reporting areas from which historical workload can be defined, or DZ's could be a Planning Department data area that could be used to identify and quantify risks with the area.
- **Community:** Diamante will review the overall profile of the community based on the unique mixture of individual occupancy risks, Demand Zone risk levels and the level of service provided to mitigate those risk levels.

EMS and specialty incident response risk assessment and outcome expectations will also be performed using the criteria from identified disciplines. For example, an EMS risk category could be trauma patients, with an expectation to stabilize and transport trauma patients to a designated trauma center within one hour of the accident occurring.

**Risk Expectations**

Diamante will take what we have found regarding what the risks exist in a particular area or community and recommend policies/procedures on how to deal with the risk, Example recommendations include: Respond to emergencies in risk areas? Deliver prevention and education programs to minimize risks? Or Mitigation and/or control of risks?

**Service Level Expectations**

After understanding the risks present in a particular area or a community, the Diamante Team will identify what control measures community stakeholders and elected officials expect? For example, does the fire agency confine the fire to the compartment of origin, area of origin, floor of origin, or building of origin? In Washoe County, some agencies in sparsely populated areas with long response times like 30 minutes or more and might have to accept (not like) an exposure level of service where a building fire does not spread to the adjoining forest and start a conflagration. In EMS we might expect to get a trauma patient to the designated trauma center within the first hour. Each risk category found in a particular area or a community will have an outcome expectation developed for it.

*Note that risks other than structure fires are typically EMS, special rescue like confined space, hazardous materials, airports and airplanes, etc.*

**Deployment – Distribution and Concentration**

The Diamante Team will then evaluate resource deployment schemes, which are influenced by

response time and create an effective response force for each risk category. Our study will include the locating of geographically distributed, first-due resources, for all-risk initial intervention. These station locations(s) are needed to assure rapid deployment to minimize and terminate average, routine emergencies. Distribution is measured by the percentage of the jurisdiction covered by the first-due units within adopted public policy response times. Recommended policies will include “benchmarks” for intervention such as arrival prior to or at flashover; arrival on EMS incidents prior to brain death in cardiac arrest. From risk assessment and benchmark comparisons, the jurisdiction will use critical task analysis to identify needed resource distribution and staffing patterns.

***A sample distribution policy statement could be:***

*“For 90% or 4 minute response time of all incidents, the first-due unit shall arrive within six minutes total reflex time. The first-due unit shall be capable of advancing the first line for fire control or starting rescue or providing basic life support for medical incidents.”*

The Diamante Team will then look at resource concentration which would include the spacing of multiple resources arranged (close enough together) so that an “effective response force” can be assembled on-scene within adopted public policy time frames. An “initial” effective response force is that which will most likely stop the escalation of the emergency for each risk type. In addressing this task, we will consider risk category type - high-risk areas need second and third due units in shorter time frames than in typical or low risk areas. Concentration pushes and pulls distribution and there is no one perfect mathematical solution. Each agency after risk assessment and critical task analysis has to be able to quantify and articulate why its resource allocation methodology meets the governing body’s adopted policies for initial effective intervention on both a first-due and multiple unit basis.

**Performance and Reliability**

Diamante will review and determine how reliable the Washoe County response system is; do agencies frequently see multiple calls for service (stacked, or queued calls) and do these degrade performance? Are there predictable times of the day, week or year when queued calls occur? Can these occurrences be controlled or can peak hour staffing be used through various models?

**Overall Evaluation**

Statistics may say one thing, but they may totally disagree with the real world experience. If so, the Diamante Team find out why and keep studying until the numbers come close to reality. Then based on good data, compare and contrast the study findings to community needs, expectations and the ability to afford. **All elected officials will then be presented with a cost-benefit analysis and final plan, not just a recommendation for a change.**



## STANDARDS OF COVER OVERVIEW

One major issue the fire service has struggled with in the past decade is defining levels of service. There have been many attempts to create a standard methodology for determining how many firefighters, fire stations, or fire inspectors a community needs.

The diversity of fire service challenges in each community has defied efforts to create a “one size fits all” solution. It is not surprising therefore, that a national or state consensus has never been reached. To address this situation, the International Association of City Managers (ICMA) and the International Association of Fire Chiefs (IAFC) formed the Commission on Fire Accreditation International (CFAI).

This process uses a “systems” approach to deployment rather than a one-size-fits all prescriptive formula. In a comprehensive approach, each agency should be able to match local need (risks and expectations) with the costs of various levels of service. In an informed public policy debate, each city council or governing board “purchases” the fire and EMS protection (insurance) the community needs and can afford.

If resources arrive too late, or are under-staffed, the emergency will continue to escalate drawing more of the agency’s resources into a losing battle. Fire companies must, if they are to save lives and limit property damage, arrive within a short period of time with adequate resources to do the job. To control a fire before it has reached its maximum intensity requires geographic dispersion (distribution) of technical expertise and cost-effective clustering (concentration) of apparatus for maximum effectiveness against the greatest number and types of risk. Matching arrival of resources with a specific point of fire growth or medical problem severity is one of the greatest challenges of chief fire officers today.

Some medical emergencies such as multiple car accidents on a freeway, or industrial accident rescues, require speedy arrival of multiple crews to control the scene, perform rescue operations, and provide medical care. A high-risk area requires timely arrival of fire companies for several reasons. More resources are required to rescue people trapped in a high-risk building with a high occupant load than in a low-risk, building with a low occupant load. More resources are required to control fires in large, heavily loaded structures than are needed for small buildings with limited contents.

There are usually three reasons to redo or challenge existing levels of service - expansion, contraction of service areas (typically the result of a reduction in service area, a decline in risk or value, or a decline in available fire protection funding), and change in risk expectations.

Regardless of the reasons, elected officials should base changes in levels of service on empirical evidence and rational discussion leading to effective, informed policy choices.

### **The Demographics of Unincorporated Washoe County**

Washoe County contains 6,540.4 square miles. The unincorporated area is 6,404.4 square miles. There are approximately 42,154 households in the unincorporated areas. The average household size in 2007 was estimated at 2.70.

The current estimated population for all of Washoe County is 419,948. It is estimated that 113,705 people live in the unincorporated areas of the County. The population grew by 28.36% between 2000 and 2007. The annual growth during the same time was 3.27%.

Fire service to the unincorporated areas of Washoe County is provided by the Truckee Meadows Fire Protection District (TMFPD), the Sierra Fire Protection District (SFPD), North Lake Tahoe Fire Protection



District (NLTFPD) and 15 separate Volunteer Fire Departments (VFD). Three of the VFD's are funded by the Washoe County general fund because they are not contained within a fire district. Five of the VFDs are funded by SFPD and the six are funded by the TMFPD. Each VFD is a 501-C non-profit corporation or association.

### **Snap Shot of SFPD Service Delivery**

The SFPD provides fire and emergency medical (paramedic level) service and response to a 214 square mile narrow ribbon of territory on the eastern slope of the Carson and Sierra Nevada Mountain range. The SFPD is located between federal and the unincorporated lands of Washoe County. The District is a wildland urban interface area served by a combination of 39 shift employees and 95 volunteers. There are three staffed stations and five volunteer stations. The District daily staffing level is thirteen including three paramedic/firefighters and a Battalion Chief. The District has one fire Prevention Captain, one Training Captain, a Fire Chief and an Administrative Secretary. The SFPD has a seasonal fire crew of 20 who complete fuels management projects and fight wildland fires. They are rated as a Type II Initial Attack (IA) Hand Crew.

### **History of the Multi-County Sierra Forest Fire Protection District**

The Sierra Forest Fire Protection District (SFFPD) was established in 1949 with the passage of Nevada Revised Statute (NRS) 473. The legal name of the NRS 473 Statute is Fire Districts Receiving Federal Aid. The original District was formed to enable federal funds authorized through the Clark/McNary Act to be utilized for watershed protection and wildfire suppression along the eastern slope of the Carson and Sierra Nevada Mountains. The District's 1949 boundaries included Carson, Douglas and Washoe County. The District was designed to provide rural fire protection for counties unable to provide protection and to serve as a fuel barrier between the U.S. Forest Service lands and the privately owned lands of each county.

At the time the District was originally formed, only states were eligible for Clark/McNary federal funds and not the counties. As a result the SFPD was operated by the Nevada State Forester/Fire Warden. The State Forester submitted budget requests for county tax dollars through each County Board of Commissioners to supplement the federal Clark/McNary funds.

Similar to the other western states, significant changes occurred throughout the SFFPD since its creation in 1949. The U.S. Forest Service acquired much of the once private timber lands. The federal aid authorized through the Clark/McNary Act expired in 2000. Urban development pushed out of the Truckee Meadows valley into the foothills coining a new term called the Wildland Urban Interface (WUI). These changes caused the SFFPD to become fractured and more difficult to manage.

### **History of the Washoe County Sierra Fire Protection District**

The Washoe County portion of the SFFPD is called the Sierra Fire Protection District (SFPD). It extends along the eastern slope of the Carson and Sierra Nevada Range and appears on the map as a rectangular 214 square mile thin ribbon of territory. The District is located between the US Forest Service and privately owned lands of unincorporated Washoe County.

Washoe County experienced the largest population growth in the area served by the Sierra Fire Protection District according to SFFPD officials. With the increased growth came an increased demand for urban level fire and emergency medical services. The State expanded service delivery and transformed the District from a wildland only fire suppression agency to an "all risk" fire agency capable of responding to structure fires, wildland fires, hazardous materials incidents, emergency medical services at the paramedic level, and rescues. A Fire Prevention Division was also added.

The NDF transfer from wildland to all risk was evaluated in a 2004 statewide study completed by a consultant company called TriData, which is a division of Systems Planning. The report made statewide recommendations regarding the future NDF mission. One of the thirty-four recommendations included:

“Make an orderly transition out of the all-risk emergency service (non-wildland fire) mission in the Sierra Forest Fire Protection District. Devolve responsibility for non-wildland fire services to local government entities capable of providing service. In particular, transition out of all-risk emergency services provided to Verdi, Bowers, and Galena.”

Before this study ended, the NDF already had taken action on this recommendation, setting a target date for transition of January 2006. The transition was completed in July of 2006.

The Tri-data study also recommended the “transition should be guided by a plan to devolve municipal fire, medical and rescue service to the TMFPD by contract.” A Washoe County Commission study conducted by Walker and Associates in 2006 recommended a series of options to achieve that goal. Efforts to implement those options were unsuccessful.

One of the findings of the 2006 Walker and Associates report was the impending financial crisis the District would be facing in the next three years (2009-2010). The Walker report recommended the District seek a merger or additional funds as an alternative to reducing current service delivery levels.

The transition from NDF to local control was completed through an interlocal agreement, which transferred personnel and equipment effective July 1, 2006. The state retained ownership of the Bowers Mansion Fire Station and transferred ownership of the Joy Lake Station to the District during the 2007 Legislative Session.

Once the transfer from state to local control was complete, the District began a long term strategic planning process. A financial analysis completed by Walker and Associates confirmed the earlier predictions of three to five year period to reach financial instability was actually going to occur in the FY 2007/08 budget. Ms. Walker estimated the District would face a \$500,000 revenue shortfall. The strategic planning committee evaluated the upcoming shortfall and concluded the District would have to reduce service levels by closing one station and eliminate up to nine positions unless additional funding or a merger occurred.

The District worked with local citizen groups to develop long term options and present them to the Board of Fire Directors. The planning committee recommended a merger or consolidation with either the City of Reno or the North Lake Tahoe Fire Protection District. Those options were opposed by Reno and NLTFPD because of financial instability and concern over subsidizing the SFPD. The planning committee recommended to the Board of Fire Commissioners a series of twenty goals that could be achieved and the necessary funding required to achieve the goals.

The 2007 Nevada State Legislature made changes to the statutes pertaining to NRS 473 and NRS 474 Fire Districts. The changes authorized procedures to establish a new District, alter boundaries for inclusion or exclusion of territory, establish budgets including the levy and collection of taxes, and authorize the issuance of bonds. The State Committee on Local Government Finance concluded that if the Washoe County Commissioners were to dissolve the SFPD NRS 473 District, replace it with a NRS 474 District, and increase the tax rate, the first year of revenue would not be subject to the tax caps enacted by the 2005 Nevada Legislature.

The Washoe County Board of Commissioners dissolved the NRS 473 Fire District and created a NRS 474 District effective July 1, 2008. As part of this change the SFPD Board of Commissioners increased the

tax rate from 42 cents to 52 cents to assure on-going service delivery.

After stabilizing service delivery, the District recommended the Board of County Commissioners, acting as the Fire Commissioners of SFPD and TMFPD, embark on long-term strategic planning effort to address the future of fire and fire based emergency medical service delivery in the entire unincorporated area of Washoe County including the Truckee Meadows Fire Protection District and the areas outside of any established fire district.

### **Governance of the SFPD and Volunteer Fire Departments**

The District is governed by the Board of County Commissioners (BCC) who serves as the SFPD Board of Fire Commissioners. The BCC also serves as the Board of Fire Commissioners for the Truckee Meadows Fire Protection District.

The Volunteer Fire Departments in the County are separate federal 501-C non-profit corporations or associations and each are governed by their own Board of Directors. The District and the VFDs have a contract for services. The contract specifies the District provide funding, apparatus, insurances, and equipment in return for qualified volunteers and response. The contract with the Washoe Valley VFD is unique in which SFPD is funding a Department that is physically located in the neighboring Truckee Meadows Fire Protection District.

### **Volunteer Fire Service**

The relationship between the Volunteer Fire Departments (VFD) and the SFPD is complex. The VFDs are separate 501-C non-profit corporations. There are five VFDs in the SFPD; Cold Springs, Galena, Peavine, Verdi, and Washoe Valley. Each VFD is governed by its own Board of Directors. The Chief of each VFD is elected by the membership. The geographical areas of each VFD overlaps portions of the TMFPD and the geographical boundaries have been impacted by annexation by the City of Reno.

There is an overlap in response to the TMFPD. The Washoe Valley VFD's only station is located in the TMFPD. The Cold Springs VFD has two stations; one station is located in the TMFPD and the second is located in the SFPD. The Cold Springs VFD area within the SFPD is less than one square mile while the Cold Springs VFD within the TMFPD is 75 square miles. Approximately 1,400 acres of Cold Springs in located in the City of Reno and the Cold Springs VFD are not allowed to respond. The same situation exists in Verdi where the Verdi VFD is not authorized to respond to the 2,400 acres of the Verdi area that has been annexed into the City of Reno.

The legal relationship between a NRS 474 Fire District and volunteers is defined in NRS 474. The law states the District has a responsibility to "support" but does not provide direction regarding authority. The SFPD and the VFD jointly developed a contract defining each party's obligations.

The District provides liability and workers compensation insurance, vehicle repair, maintenance of apparatus and facilities, facility insurance, utility payments, uniforms, personal protective equipment and training. In return, each VFD agrees to follow District policy and provide trained and qualified volunteers.

Accountability in meeting training standards has been an area of conflict between the VFD's and their respective Districts. The SFPD District has implemented training levels allowing for additional opportunities for volunteers in support roles.

The VFD's are working with both Districts to provide a consistent program between the VFDs and SFPD and the TMFPD.

## THE COMMUNITIES OF THE SIERRA FIRE PROTECTION DISTRICT

The overall District contains:

Fire Department or District	Parcels	Assessed Land	Assessed Buildings	Assessed Total
Sierra Fire Protection District	8,434	539,559,723	672,712,426	1,212,272,149

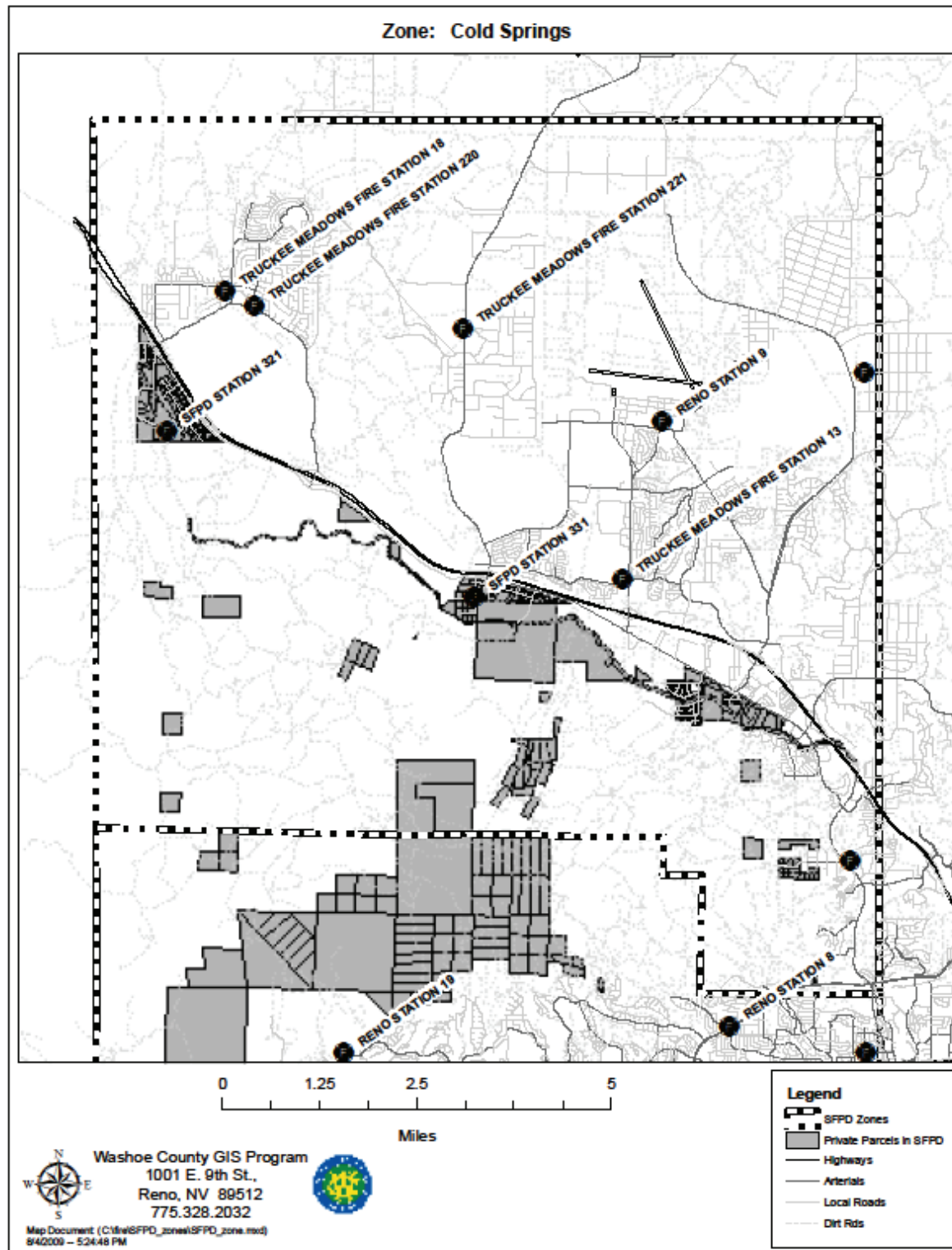
There are five areas within the SFPD. They include Washoe Valley, Galena, Verdi, Peavine and Cold Springs.

### Cold Springs

Cold Springs is located at the northwest sector of the Sierra Fire Protection District bordering California. The District provides service to .97 of a square mile. The remaining 66.5 square miles are served by TMFPD and the City of Reno. In 2004, 17 landowners convinced the Reno City Council to annex several thousand acres of Cold Springs Valley, over the protests of a majority of long-time residents.

According to Washoe County GIS the Cold Springs Valley area contains:

Cold Springs			
Total Square Miles	SFPD Square Miles	SFPD %	Other Jurisdiction %
66.5	0.97	1%	99%
Total Population	SFPD Population	SFPD Population %	Other Jurisdiction Population %
21,852	218	1%	99%
Total AV	SFPD AV	SFPD AV %	Other Jurisdiction AV %
1,847,126,621	615,708,874	30%	70%
Total FD Dollars	SFPD Dollars	SFPD %	Other Jurisdiction %
\$960,505,843	\$32,017	3%	97%



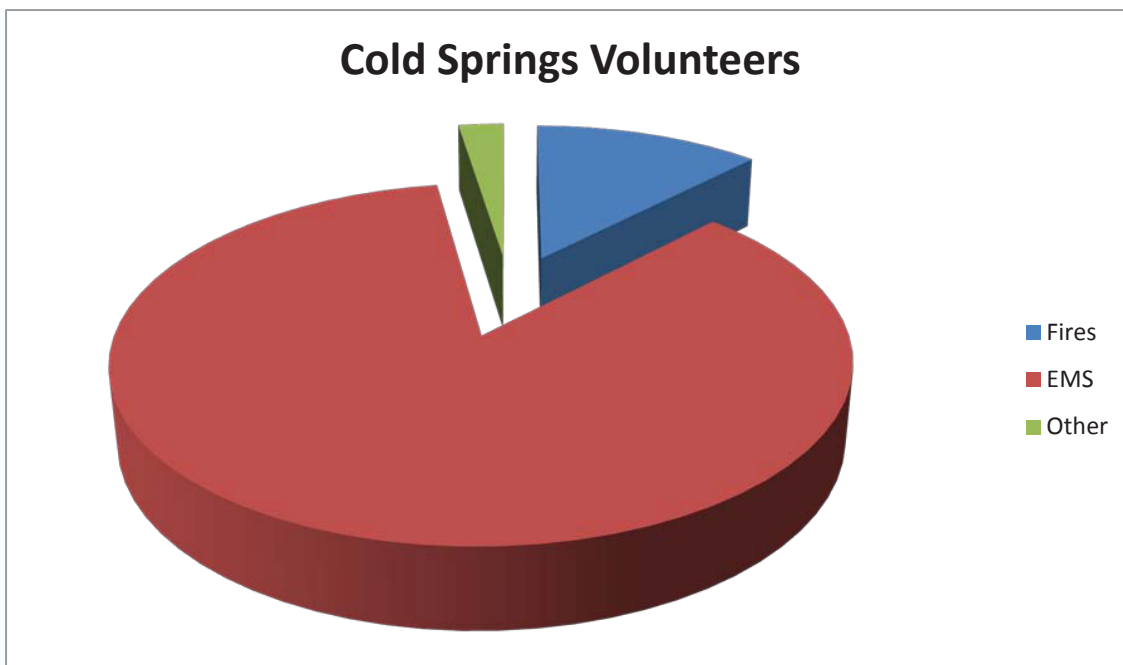
The SFPD area is served by the Cold Springs VFD. The CSVFD has two stations and separate contracts with SFPD and the TMFPD. One of the stations serves the SFPD in a wildland role and the second station serves the TMFPD area.

**Cold Springs Volunteer Call Analysis 2007**

2007 Call data was unavailable

**Cold Springs Volunteer Call Analysis 2008**

Type of Call	Number of Calls
Fires	5
EMS	35
Other	1
Total	41



These numbers reflect the total calls in Cold Springs District Run Card 3508. Unknown how many of the incidents the Volunteer Fire Department responded to.

**Galena and the Mt. Rose Corridor**

The Mt. Rose corridor community is located in southwest Washoe County in the Galena area along State Route 431. The community is situated on the east-facing mountain slopes of the Carson Range and includes the developments of St. James, Galena Forest Estates, Scotch Pine, Montreaux Callahan Ranch, the Estates at Mount Rose, Arrowcreek, Saddlehorn, Rolling Hills, Galena Country Estates and a portion of Field Creek.

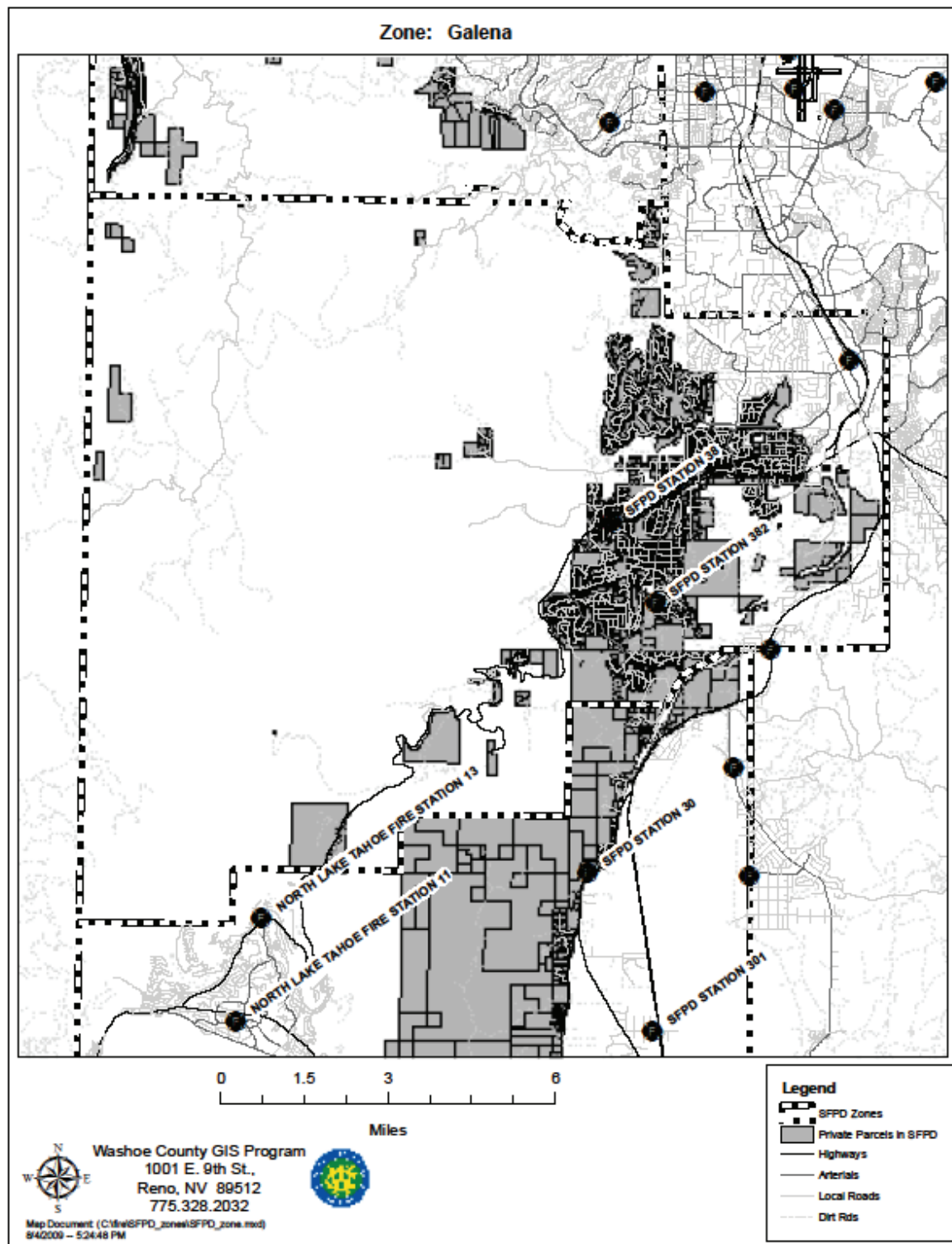


According to Washoe County GIS the Galena and Mt. Rose Corridor:

Galena			
Total Square Miles	SFPD Square Miles	SFPD %	Other Jurisdiction %
142.87	127.89	90%	10%
Total Population	SFPD Population	SFPD Population %	Other Jurisdiction Population %
20,216	13,953	69%	31%
Total AV	SFPD AV	SFPD AV %	Other Jurisdiction AV %
1,109,672,991	92,472,749	8%	92%
Total FD Dollars	SFPD Dollars	SFPD %	Other Jurisdiction %
\$6,769,005	\$4,808,583	71%	29%

The community hazard assessment resulted in classifying the Mt. Rose corridor in the high hazard category with areas of extreme hazard rating. Primary factors that determined the hazard rating for the Mt. Rose corridor included the potential fire behavior related to topography and vegetative fuels, limited water sources within the community for fire suppression, and the distance from fire suppression resources.





The Mt. Rose corridor and Galena area is served by a career station located on the Mt. Rose Highway.

The Mt. Rose corridor and Galena area is served by a career station located on the Mt. Rose Highway staffed with a four person engine company that includes a firefighter/paramedic and the Galena Volunteer Fire Department.

***The Galena Volunteer Fire Department provided this information***

The Galena Volunteer Fire Department was established in 1956 and provides fire protection, EMS and light rescue services to the residential areas, moderate degree of commercial development, and the national forest area in the Mt. Rose area south of Reno and adjacent to private and federal lands of Washoe County in conjunction and with and through an inter-local agreement with the Sierra Fire Protection district. Topographically, this response area consists of an alluvial fan where expansive Wildland urban interface residential growth has taken place surrounded by very steep, mountainous terrain.

The major risk scenarios within the VFD is the Galena Wildland Urban Interface area which has one of the greatest exposures of possible catastrophic wildfire occurrence in the State. The twenty four mile long, two lane Mt. Rose Highway rises from the valley floor on the Reno side, crosses the summit at 8911 feet and terminates at Lake Tahoe level at the north shore presenting challenging response opportunities during the winter. Galena VFD borders the North Lake Tahoe Fire Protection District.

Galena Volunteer Fire Chief, Peter A. Cannizzaro

**Galena VFD Apparatus**

Type	Year	Purpose
4x4 Type 1 Engine	1996	Structure Engine
4X4 Type 3 Engine	1996	WUI Engine
4X4 rescue truck	2005	Light Rescue

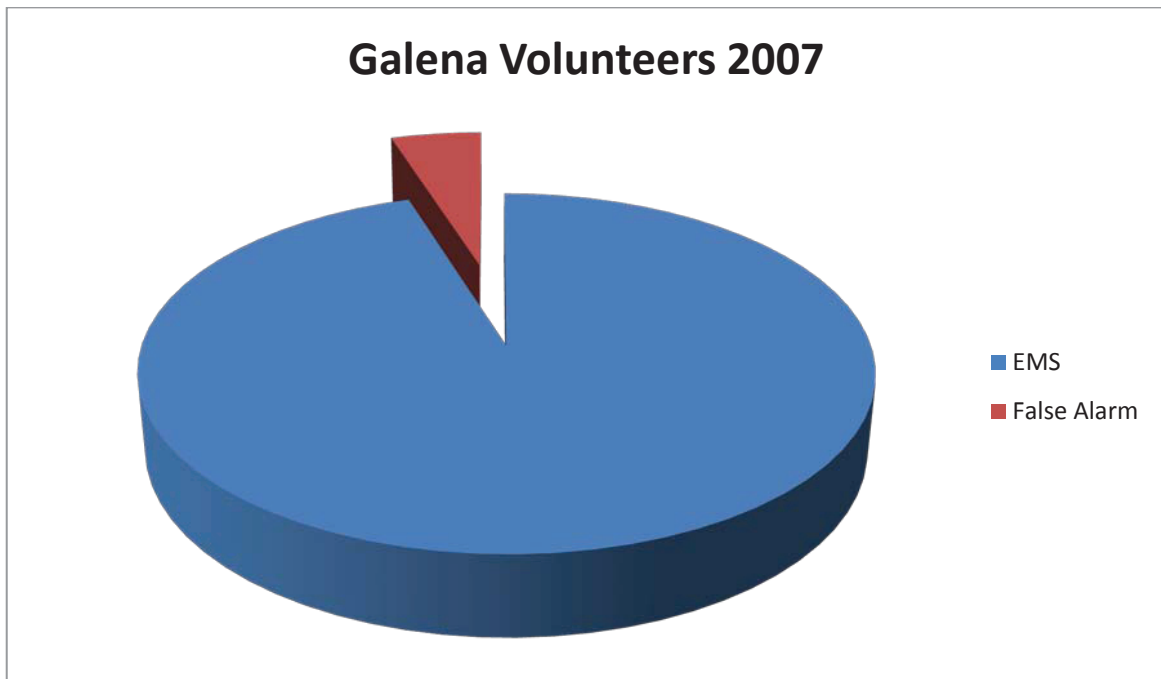
**Galena VFD Personnel**

11 Personnel certified to Firefighter 1 or greater
3 Entry level Firefighters
3 Support Personnel
3 other Trainees

**Galena Emergency Medical Service Response Capabilities**

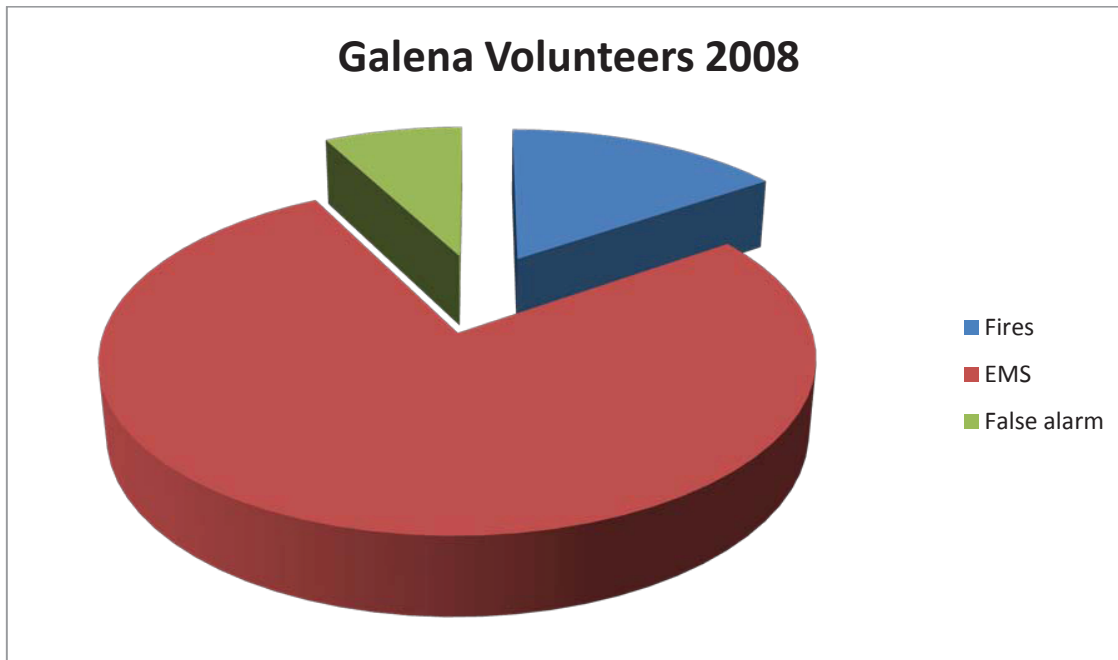
3 Paramedics not authorized to practice under SFPD umbrella
5 EMT intermediate
5 EMT basic
2 First Responder Trainees

Type of Call	Number of Calls
EMS/Rescue	39
False Alarms	2
Total	41



### Galena Volunteer Fire Department Call Analysis 2008

Type of Calls	Number of Calls
Fires	2
EMS	10
False Alarms	1
Total	13



#### Peavine

#### Peavine

Peavine is located in the northwest sector of the Sierra Fire Protection District, south of Cold Springs. The Anderson Acres community is located north of Reno, south of Stead, and southwest of US Highway 395. The community is situated on east-facing foothills of Peavine Mountain.

Peavine			
Total Square Miles	SFPD Square Miles	SFPD %	Other Jurisdiction %
17.75	6.15	35%	65%
Total Population	SFPD Population	SFPD Population %	Other Jurisdiction Population %
3,869	121	3%	97%
Total AV	SFPD AV	SFPD AV %	Other Jurisdiction AV %
12,065,111	268,114	2%	98%
Total FD Dollars	SFPD Dollars	SFPD %	Other Jurisdiction %
\$73,597	\$13,942	53%	47%

The community hazard assessment resulted in classifying Peavine in the moderate hazard category. Primary factors that determined the hazard rating in Anderson Acres included the limited fire suppression resources, inadequate defensible space implementation, and inadequate address signage throughout the community.

Peavine is served by the Peavine Volunteer Fire Department. The closest SFPD career station is in Verdi. The closest career fire station is Reno Station 13 in Stead.

***The Peavine Volunteer Fire Department provided this information***

Peavine Volunteer Fire department is located on the east side of Peavine Mountain which is 11 miles north of Reno off Highway 395. The response area is approximately 25 square miles. Most of that is on Peavine Mountain. The boundaries include Copperfield Road to the North, Old North Virginia to the East, Hoag Road to the South and the crest of Peavine Mountain where the radio towers are to the West.

The major risk scenarios for Peavine VFD are the old mines on Peavine Mountain and the railroad.

Peavine Volunteer Fire Chief David Rebhan

**Peavine Apparatus**

Type 3 Brush Engine
2000 Gallon Water Tender
Type 6 Brush Engine

**Peavine VFD Personnel**

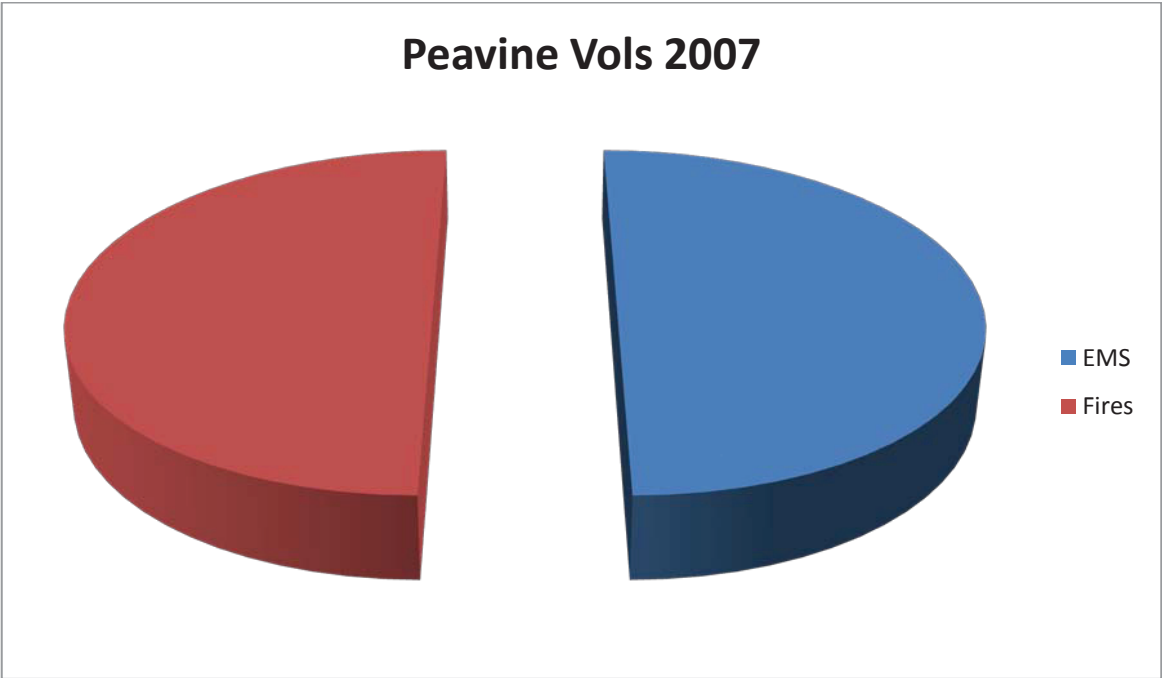
8 All risk Firefighters
2 Support/Logistics Personnel
1 Entry Level Firefighter

**Peavine Emergency Medical Service Response Capabilities**

3 EMT basic
5 First Responder

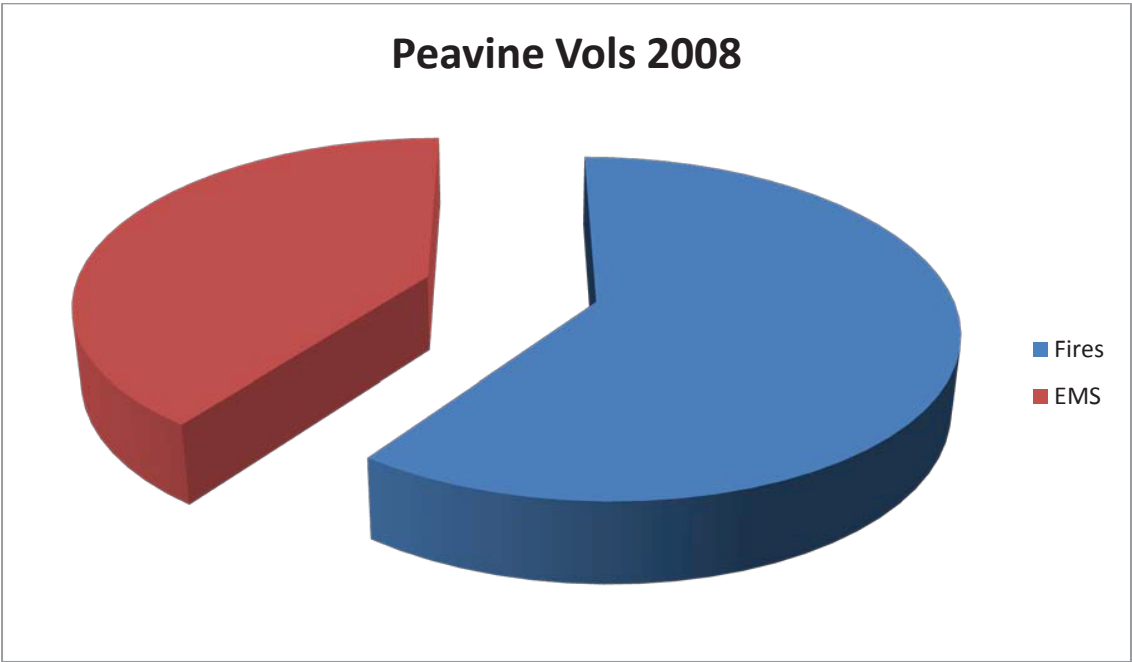
**Peavine Volunteer Fire Department Call Analysis 2007**

Type of Call	Number of Calls
Fires	5
EMS	5
Total	10



**Peavine Volunteer Fire Department Call Analysis 2008**

Type of Call	Number of Calls
Fires	3
EMS	2
Total	5



## Verdi

Verdi-Mogul is located at the western border of Nevada, adjacent to the California state line at the 120th meridian west. Verdi is located adjacent to the California state line west of Reno, northwest along Interstate 80. The community is situated in the canyon between Peavine Peak and the northern extent of the Carson Range.

Verdi			
Total Square Miles	SFPD Square Miles	SFPD %	Other Jurisdiction %
77.03	37.65	49%	51%
Total Population	SFPD Population	SFPD Population %	Other Jurisdiction Population %
7,682	3098	40%	60%
Total AV	SFPD AV	SFPD AV %	Other Jurisdiction AV %
279,848,798	161,824,932	17%	83%
Total FD Dollars	SFPD Dollars	SFPD %	Other Jurisdiction %
\$1,707,078	\$841,490	20%	80%

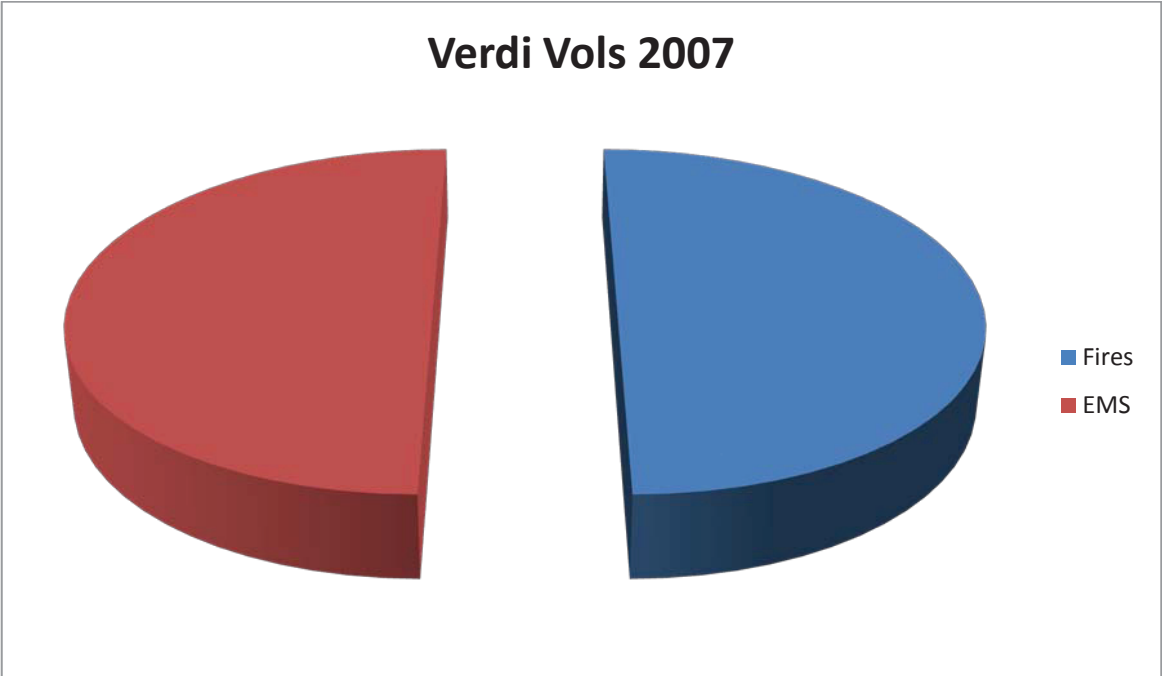
The community hazard assessment resulted in classifying Verdi in the moderate hazard category with some areas rated as extreme fire hazard. Primary factors that determined the hazard rating in Verdi included the potential fire behavior based on fuel hazards and topographic conditions in the community.

The Verdi area is served by a SFPD career station with a four person engine company that includes a firefighter/paramedic and the Verdi Volunteer Fire Department.

### Verdi Volunteer Fire Department Call Analysis 2007

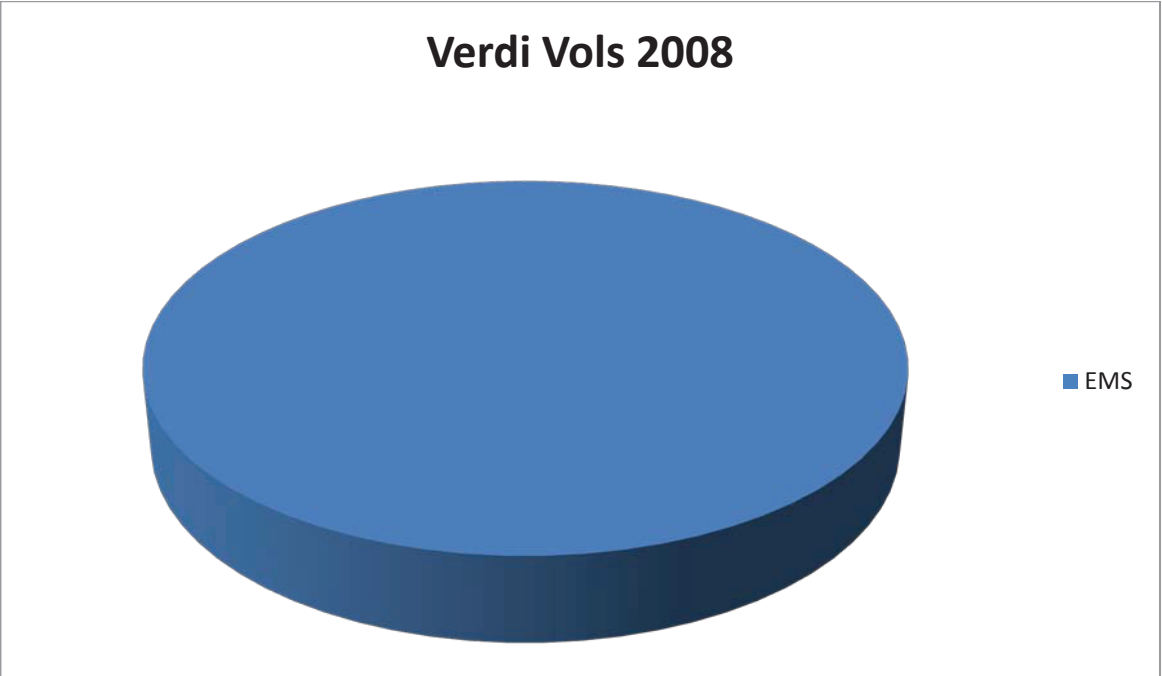
Type of Calls	Number of Calls
Fires	3
EMS	3
Total	6

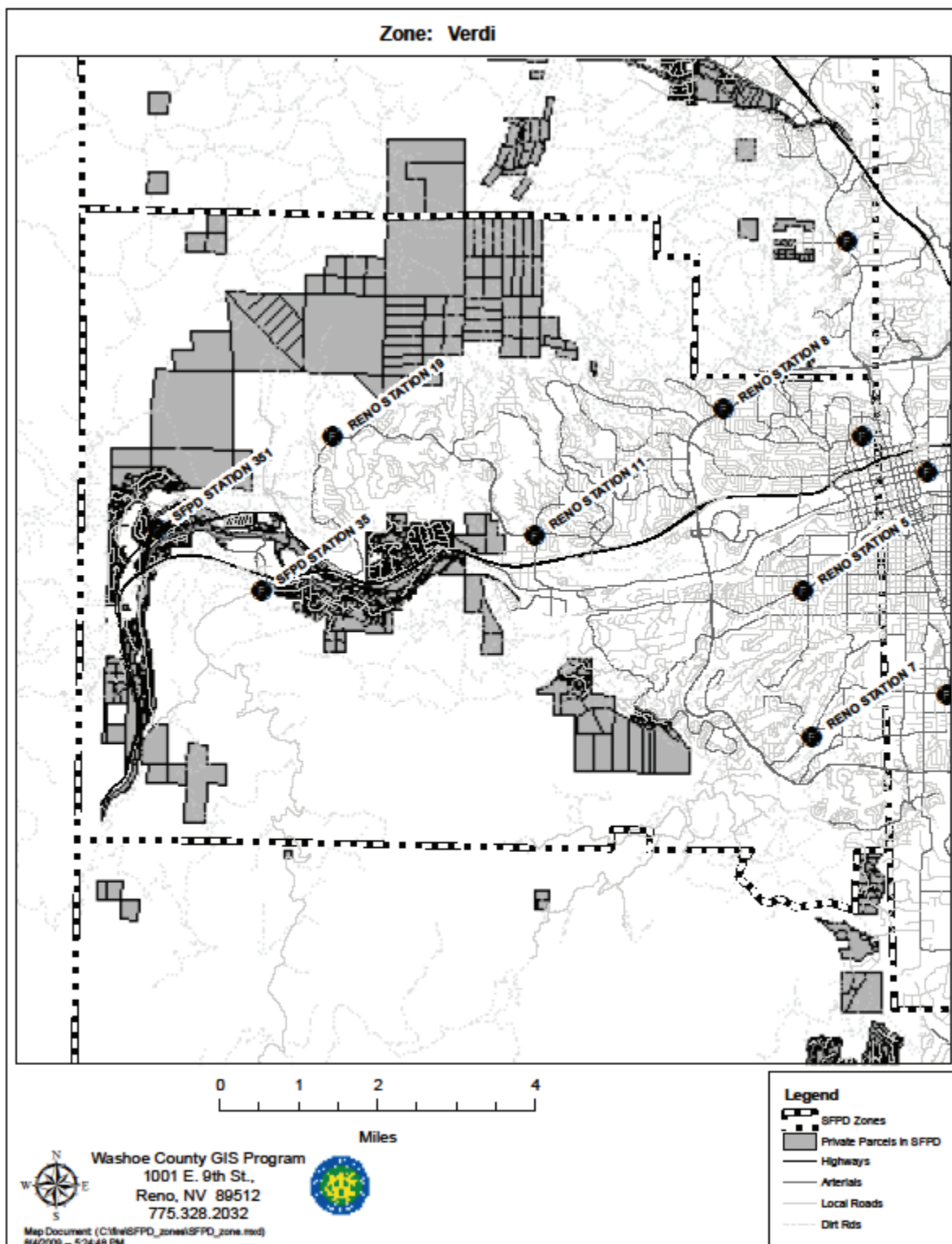




**Verdi Volunteer Fire Department Call Analysis 2008**

Type of Calls	Number of Calls
EMS	3
Total	3



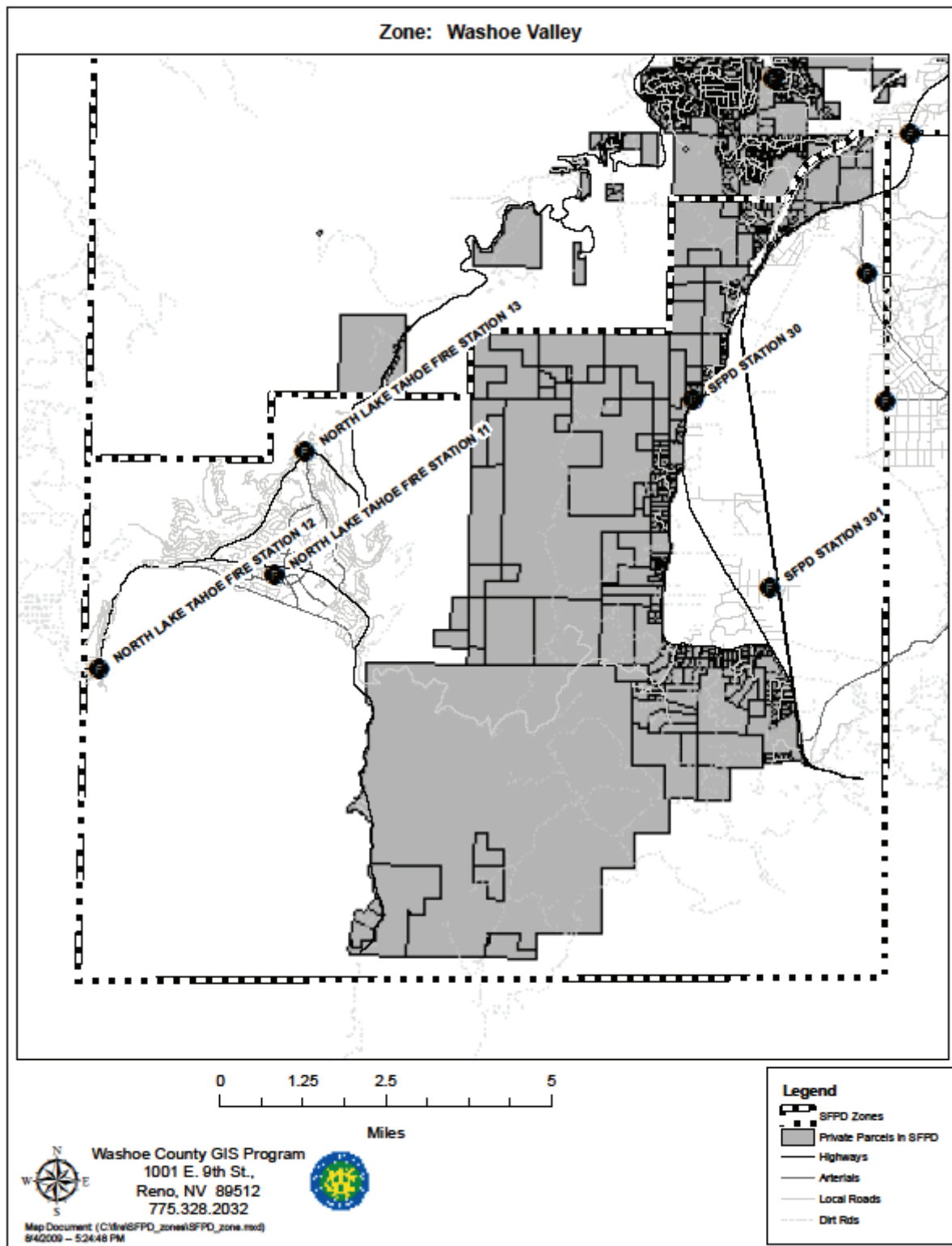


**West Washoe Valley**

The West Washoe Valley community is located between Washoe City and Carson City, west of Washoe Lake. The community is situated at the base of the east slope of the Carson Range.

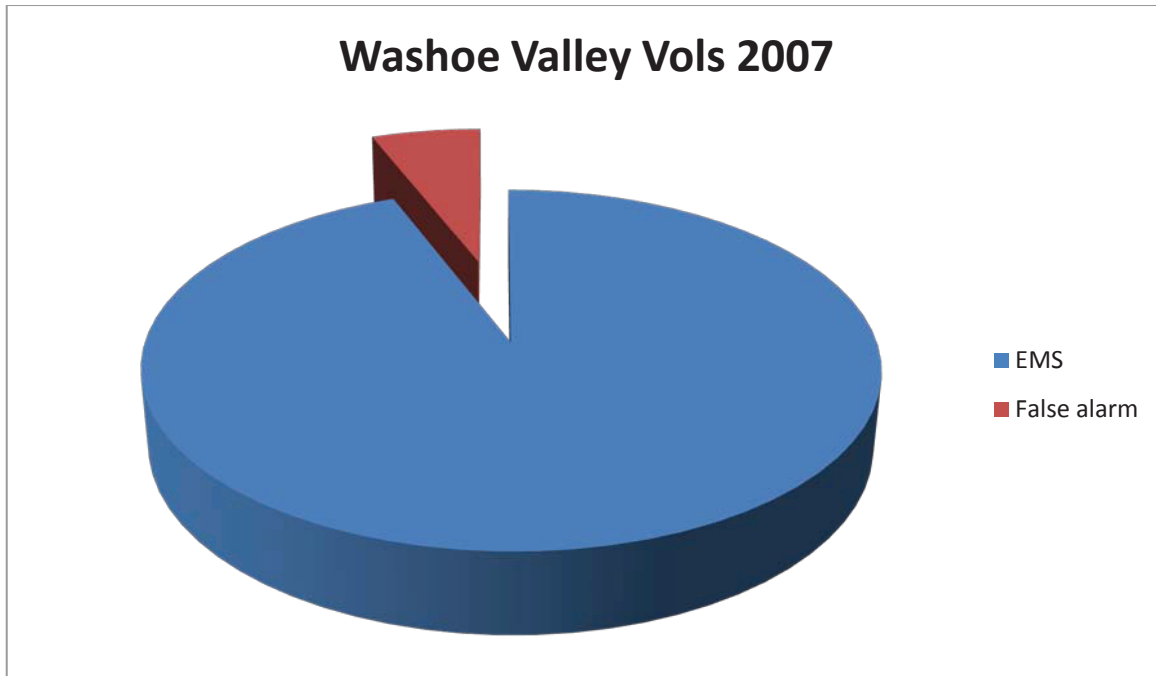
Washoe Valley			
Total Valley Square Miles	SFPD Square Miles	SFPD %	Other Jurisdiction %
117.25	8.5	7%	93%
Total Population	SFPD Population	SFPD Population %	Other Jurisdiction Population %
21,882	512	2%	98%
Total AV	SFPD AV	SFPD AV %	Other Jurisdiction AV %
184,712,662	61,570,887	30%	70%
Total FD Dollars	SFPD Dollars	SFPD %	Other Jurisdiction %
\$1,126,747	\$320,169	35%	65%

The community hazard assessment resulted in classifying West Washoe Valley in the extreme category. Primary factors that determined the hazard rating in West Washoe Valley included the potential fire behavior related to topography and vegetative fuels, limited water sources within the community for fire suppression, and flammable roofing in many areas of the community.

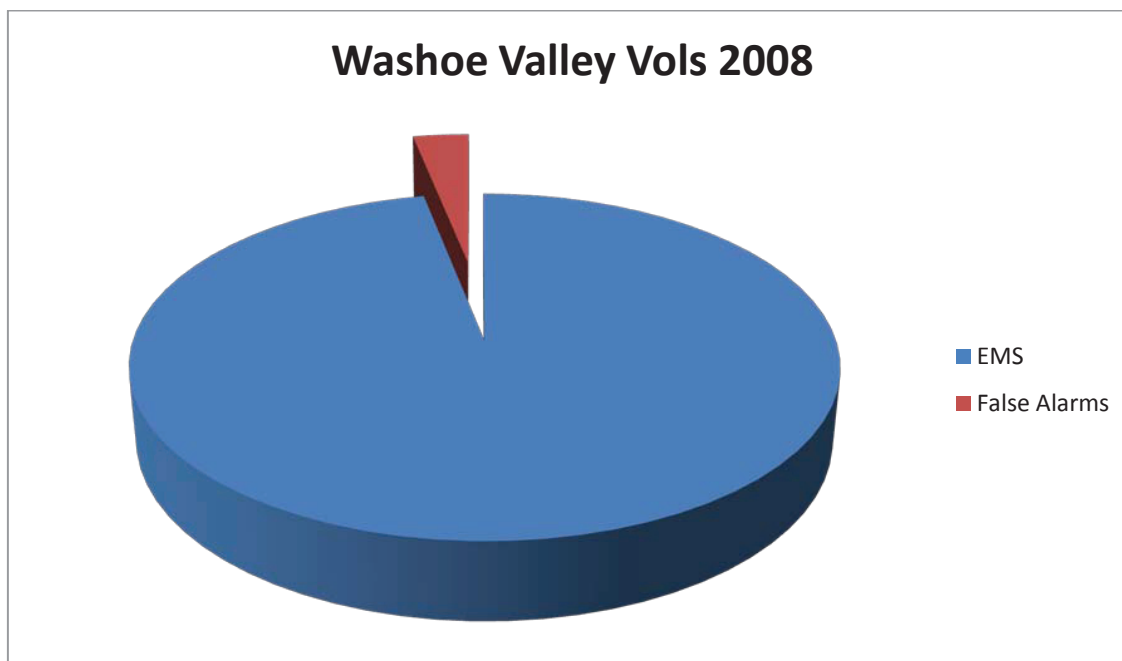


**Washoe Valley Volunteer Fire Department Call Analysis 2007**

Type of Calls	Number of Calls
EMS	16
False Alarm	1
Total	17

**Washoe Valley Volunteer Fire Department Call Analysis 2008**

Type of Calls	Number of Calls
EMS	31
False Alarms	1
Totals	32



The SFPD area is served by a four-person engine company that includes a firefighter/paramedic located at the Bowers Fire Station and the Washoe Valley VFD. The Washoe Valley VFD station is located on Bellevue Road in the TMFPD.

#### Summary

The SFPD communities are separated by the Truckee Meadows Fire Protection District and the City of Reno. The original District, established in 1949 to serve as a rural fire protection district, is now fractured by population growth and annexation.

The impact of annexation has resulted in loss of revenue while maintaining the same number of career fire stations and level of service.

*The Mission of the Sierra Fire Protection District has changed from the original rural fire district established in 1949. Sierra Fire Protection District has assumed the role of an all risk organization but had not build the infrastructure to accomplish that goal, which would include nearby Sierra Fire Stations to be able to fulfill a full alarm response for a structure fire. Sierra Fire Protection District has kept the footprint of the rural fire stations in a suburban setting.*

Two of the three SFPD stations are located in areas without sufficient tax revenue to support a career station. The Verdi and Washoe Valley stations are currently located where a majority of the emergency responses are to other jurisdictions. This situation is clearly demonstrated in Washoe Valley. In Washoe Valley, the District has a career station that costs approximately \$2 million per year to operate. The District receives \$320,169 in tax revenue, or 5% of the District budget from SFPD taxpayers in Washoe

Valley. The SFPD tax base to support the station only comes from 7% of the total Washoe Valley area. Despite these figures, the Washoe Valley station responds 74% of the time to TMFPD without reimbursement. This has created a fiscal equity situation resulting in a continuing financial hardship on the District.

The Washoe Valley Station is subsidized by the Galena/Mt. Rose area tax base, which provides \$4,808,583 in annual operating revenue. The Mount Rose area needs a fire station to serve the SFPD area that has response times averaging 15 minutes.

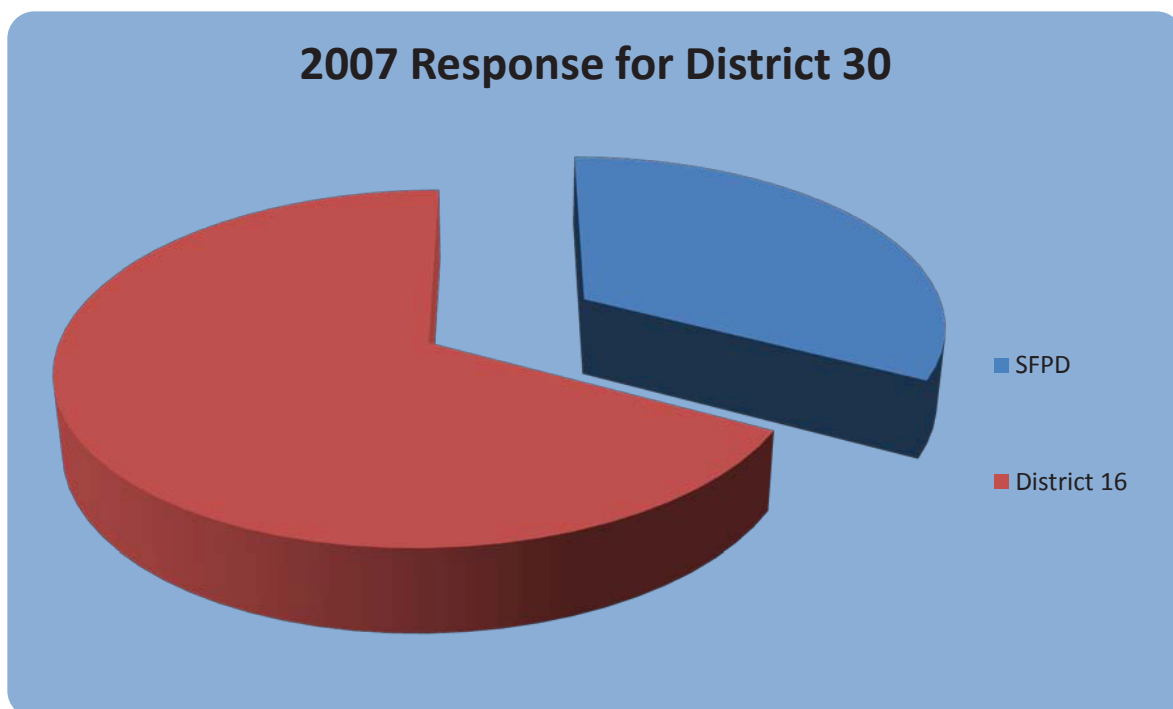
#### **SFPD Paid Station response data**

The Sierra Fire Protection District has three career stations: Washoe Valley in District 30, Verdi in District 35 and District 38 is the Galena/Mt Rose Corridor. Sierra Fire Protection District is a new agency; this analysis is of the entire history of the organization from July 1, 2006 - Feb 24, 2009. This does not provide for comprehensive evaluation of call volume nor trends, but does provide some insight to the call activity of the organization.

#### **District 30- Washoe Valley**

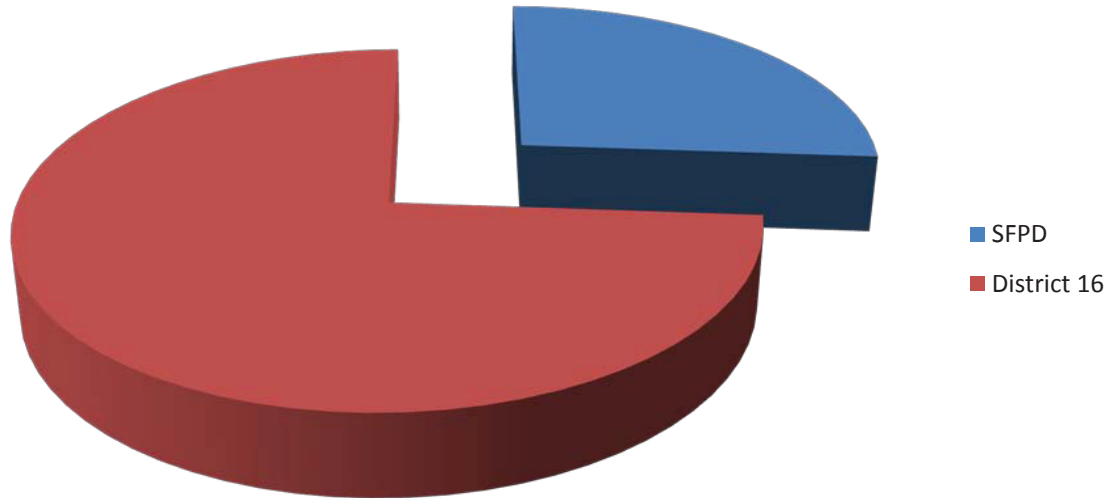
<b>Year</b>	<b>2007</b>	<b>2008</b>	<b>2009*</b>
<b>Total Response</b>	<b>174</b>	<b>180</b>	<b>110</b>
<b>In District Response</b>	<b>57</b>	<b>47</b>	<b>19</b>
<b>Percentage</b>	<b>32.76%</b>	<b>26.11%</b>	<b>17.27%</b>
<b>District 16 Response</b>	<b>117</b>	<b>133</b>	<b>91</b>
<b>Percentage</b>	<b>67.24%</b>	<b>73.89</b>	<b>82.73%</b>

**\*2009 YTD as of 8/3/09**





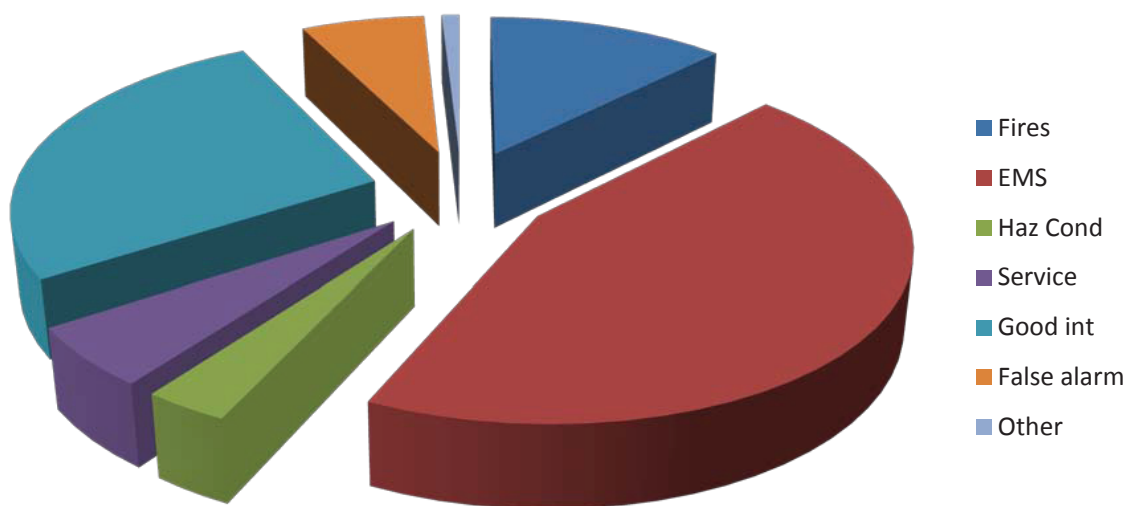
## 2008 Response for District 30



### Analysis of Station 30 Calls 2007

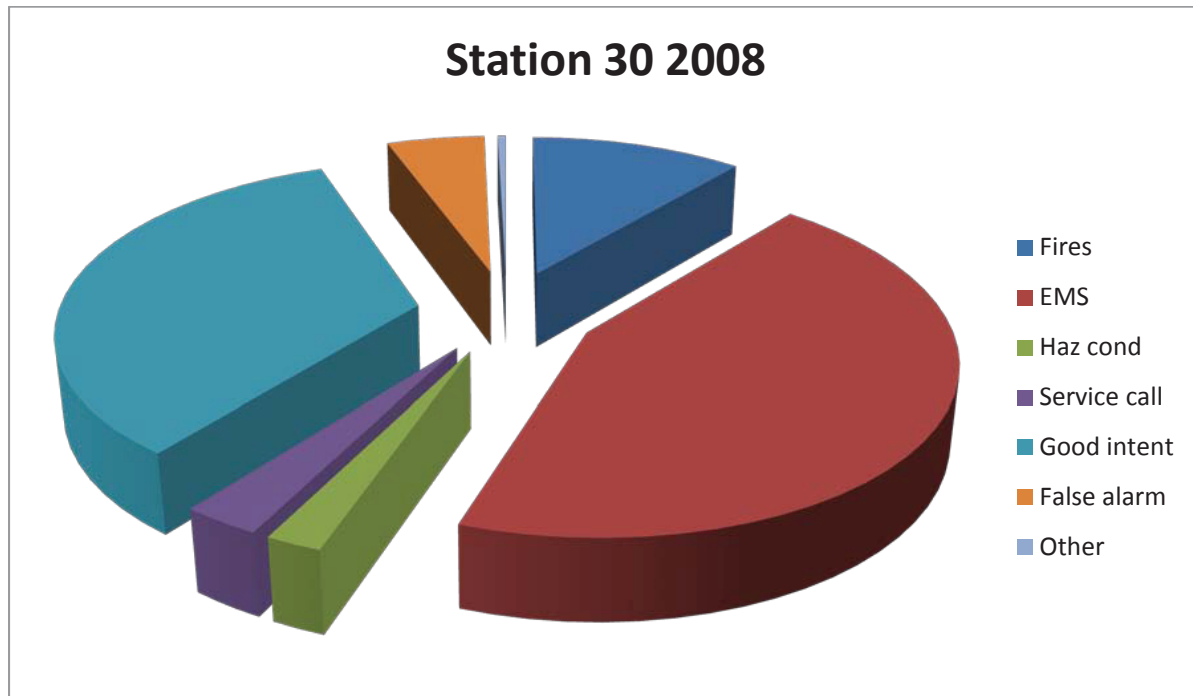
Type of Call	Number of Calls
Fires All	27
EMS/Rescue	96
Hazard condition	7
Service call	12
Good intent	58
False alarm	14
Other	2
Total	216

### 2007 Stat 30



**Analysis of Station 30 2008**

Type of Call	Number of Calls
Fires All	26
EMS/Rescue	103
Hazard condition	5
Service call	7
Good intent	79
False alarms	12
Other	1
Total	233



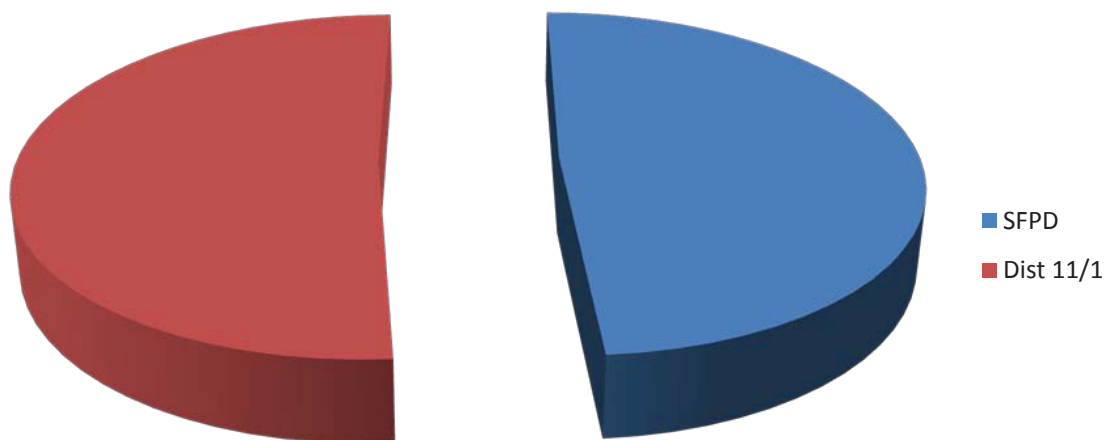
District 35- Verdi

Year	2007	2008	2009*
Total Response	432	491	250
In District Response	211	294	156
Percentage	48.84%	59.88%	62.40%
District 11/19 Responses	221	197	94
Percentage	51.16%	40.12%	37.60%

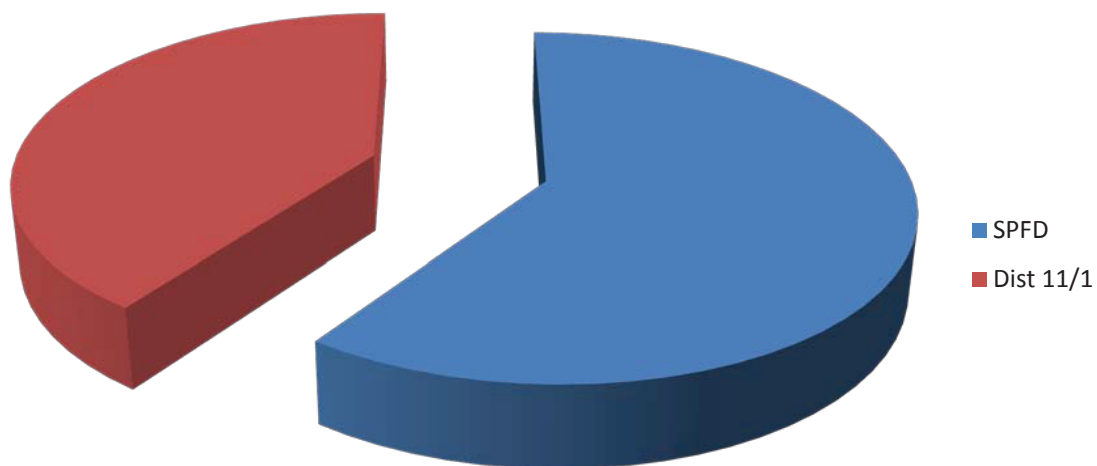
\*2009 YTD as of 8/3/09

**Analysis of Station 30 2007**

### 2007 Response for District 35

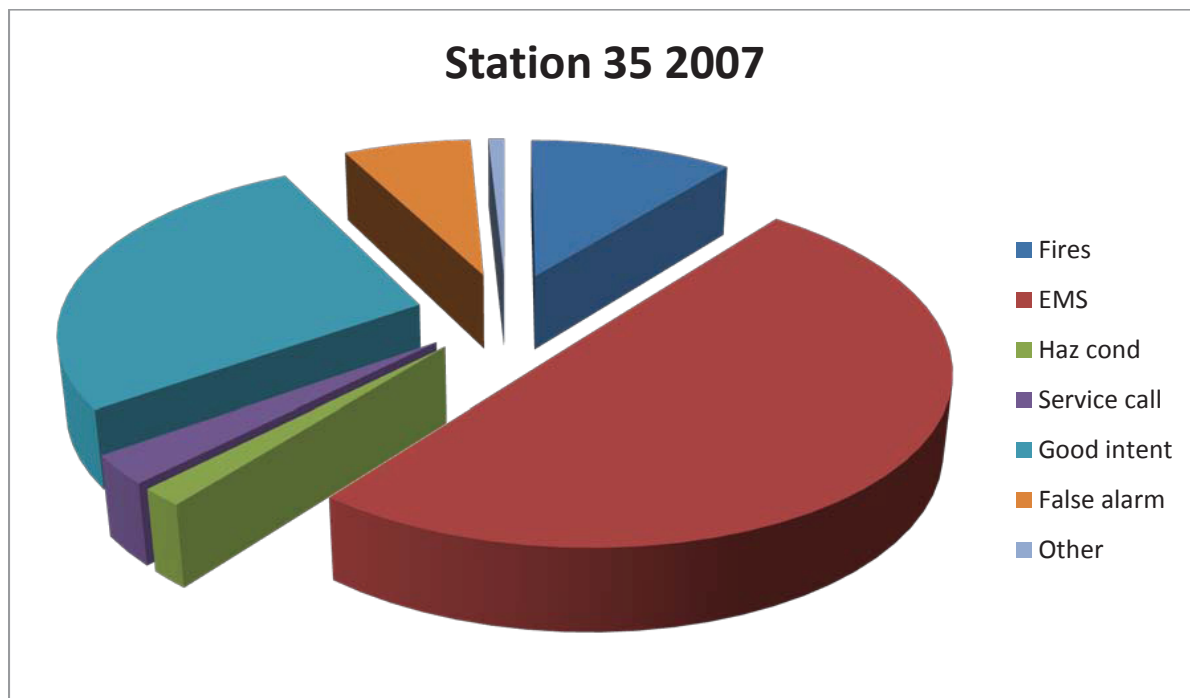


### 2008 Response for District 35

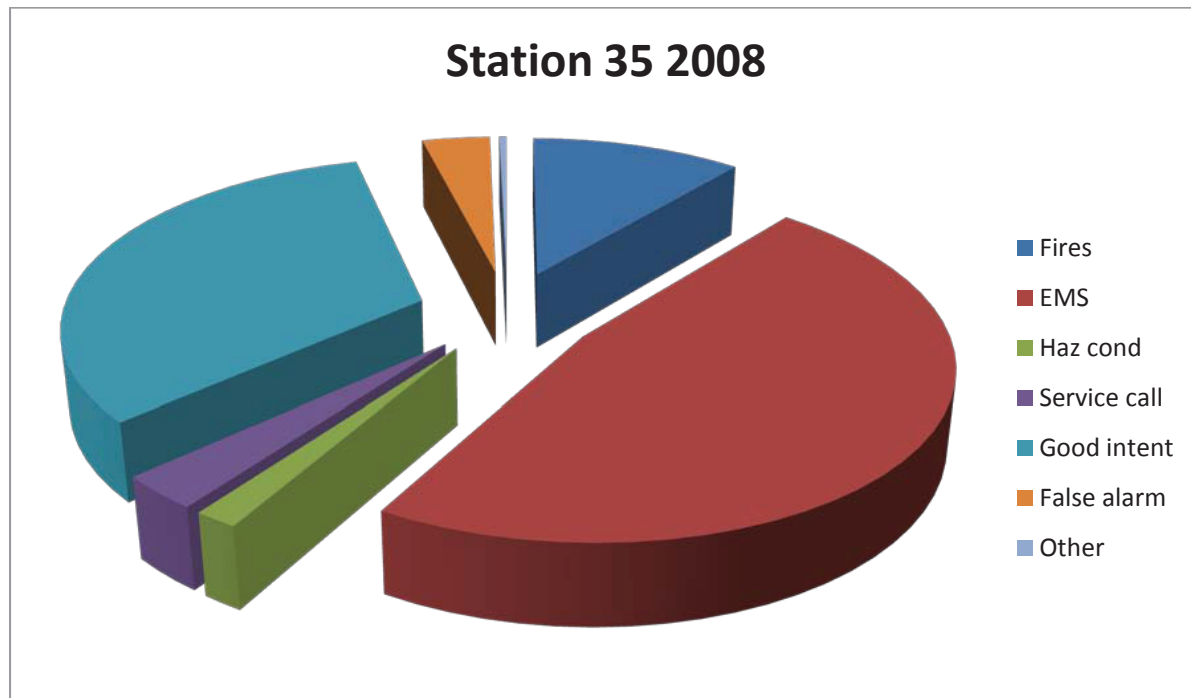


**Analysis of Station 35 2007**

Type of Call	Number of Calls
Fires All	51
EMS/Rescue	237
Haz condition	8
Service calls	13
Good intent	130
False Alarm	32
Others	4
Totals	475

**Call Analysis Station 35 2008**

Type of Call	Number of Calls
Fires All	58
EMS/Rescue	251
Hazardous cond	9
Service call	17
Good intent	174
False alarms	19
Others	2
Totals	531

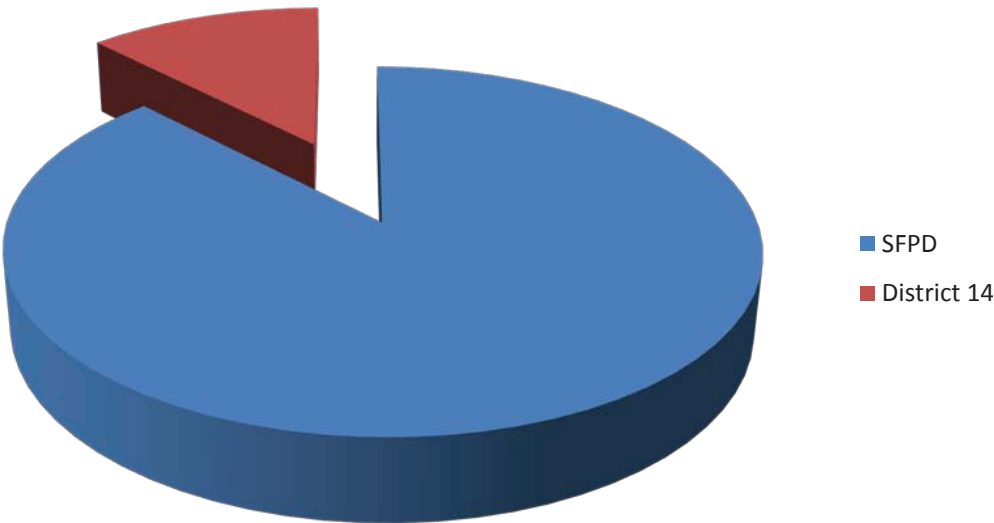


#### District 38- Galena and Mt. Rose Corridor

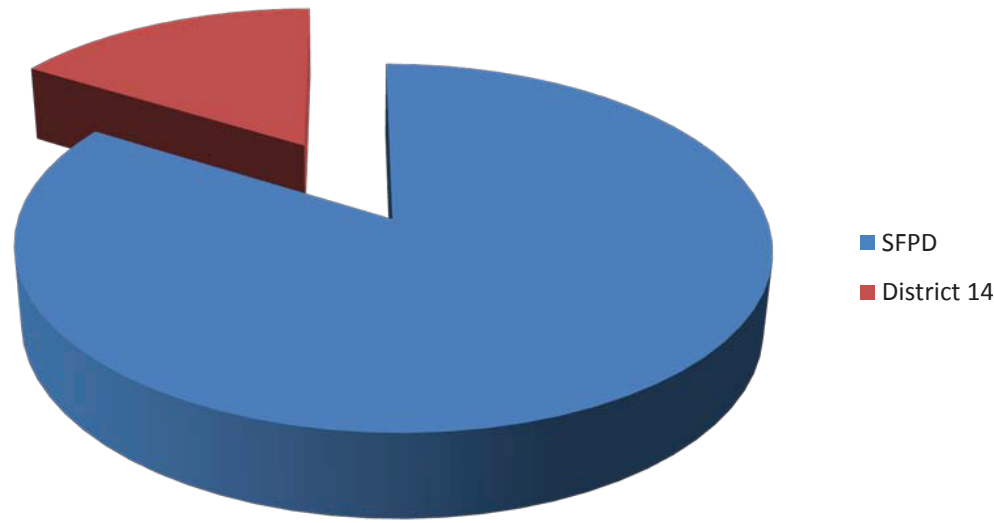
Year	2007	2008	2009*
Total Response	580	644	341
In District Response	509	644	341
Percentage	87.76%	83.85%	82.37%
District 14 Response	71	124	73
Percentage	12.24%	16.15%	17.63%

\*2009 YTD as of 8/3/09

2007 Response for District 38

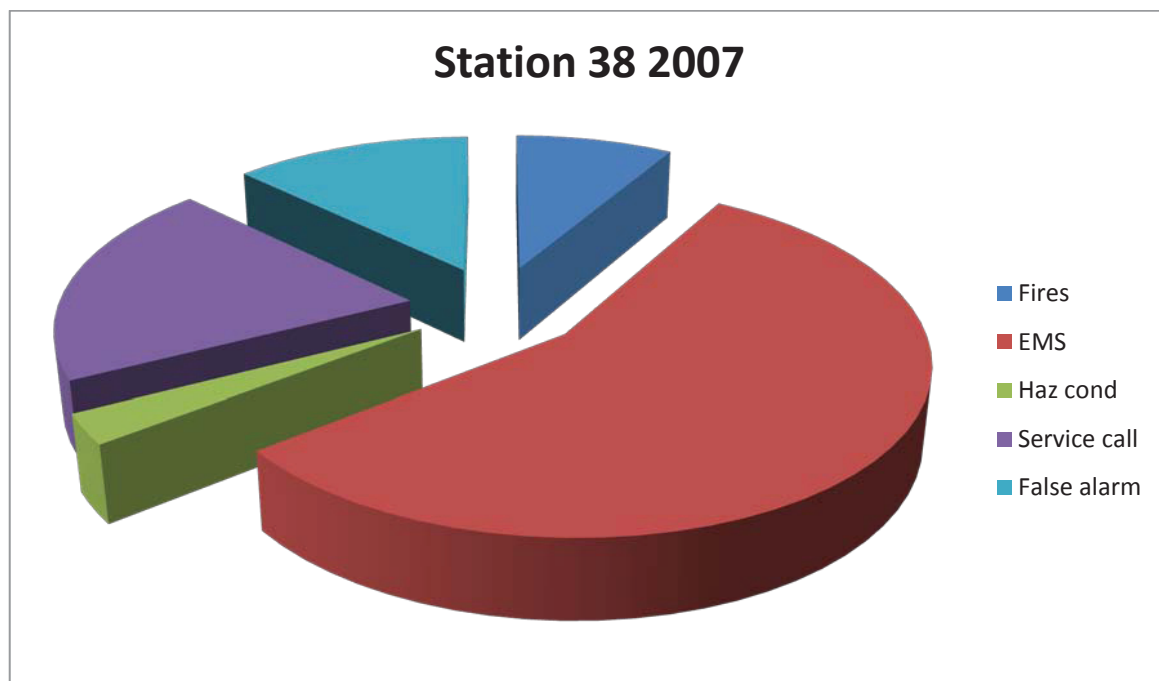


2008 Response for District 38



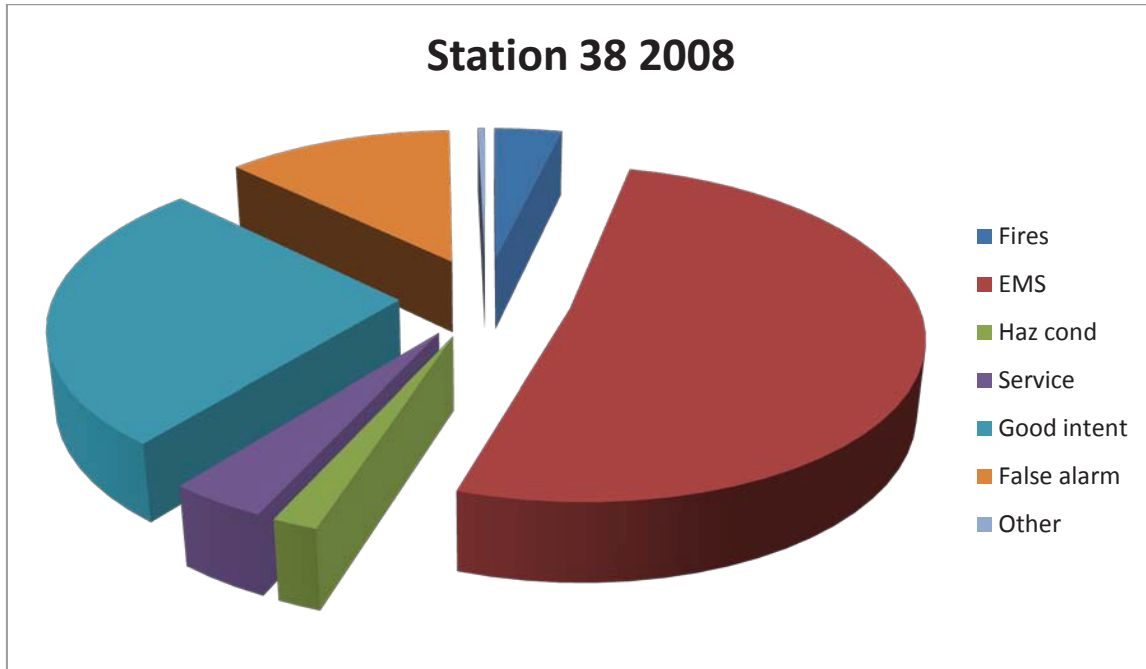
**Analysis of Station 38 calls 2007**

Type of Calls	Number of Calls
Fires All	47
EMS/Rescue	311
Hazardous cont	16
Service calls	20
Good intent	110
False alarm	71
Total	575

**Analysis of Station 38 2008**

Type of Call	Number of Calls
Fires All	29
EMS	401
Hazardous cond	14
Service calls	30
Good intent	207
False alarm	97
Other	3
Totals	781





#### Mutual Aid Given and Received

There is a significant discrepancy between Sierra Fire Protection Districts response information and that of Washoe County (North Lake Tahoe Fire Protection District) and by ECOMM (Reno). To provide equal points of view for this report the following information has been reported.

#### Mutual and Automatic Aid Sierra Fire Protection District

##### Reno-Truckee Meadows Fire Protection District

#### 2007

Mutual Aid Received from Reno/TM	26
Mutual Aid Given by SFPD	15
Automatic Aid Received from Reno/TM	128
Automatic Aid Given by SFPD	55

#### 2008

Mutual Aid Received from Reno/TM	30
Mutual Aid Given by SFPD	23
Automatic Aid Received from Reno/TM	150
Automatic Aid Given by SFPD	74

Source : Reno Emergency Communications

Mutual and Automatic Aid Received Sierra Fire Protection District  
North Lake Tahoe Fire Protection District

2007

Mutual Aid Received from NLTFPD	4
Automatic Aid Received from NLTFPD	76

2008

Mutual Aid Received from NPTFPD	4
Automatic Aid Received from NLTFPD	234*

\*The Significant difference in numbers was explained by NLTFPD that Sierra Fire worked with Washoe County GIS and altered their boundaries to reflect their actual district boundaries.

Source: Washoe County Communications, Incline Village

### Emergency Medical Service Delivery

Emergency medical services are provided by responders classified as First Responder and Emergency Medical Technicians (EMT's). All career departments in the County are staffed with EMTs. There are three levels or classifications of EMT's: EMT Basic, EMT Intermediate, and EMT Paramedic. The training for an EMT Basic is 160 hours, an EMT-Intermediate is an additional 100 hours and an EMT-Paramedic is 1,800 hours, which includes a clinical internship at a hospital. The EMT-B is certified to provide basic life support including splinting and bandaging. The EMT-I is certified to provide basic life support plus provide additional airway procedures, place IVs and administer several medications. An EMT-Paramedic can provide additional care above an EMT-I by administering additional medications and airway procedures. The EMT-P provides the highest level of care.

The City of Reno and TMFPD fire engines are staffed with EMT-B and EMT-I personnel. The SFPD provides EMT-Paramedics on fire engines assisted by a combination of EMT-B and EMT-I's. The NLTFPD provides EMT-Paramedic service on patient transport ambulances and paramedic staffed fire engines.

Sierra Fire Protection District has eleven paramedics. Nine of them are firefighter/paramedics and two of them are operator/paramedics. The District has a Battalion Chief with the collateral duty of EMS. The BC attends the pre-hospital care medical committee made up of the emergency department physicians and functions as the District liaison with the State EMS Office. The EMC BC works with the senior paramedic on each shift for quality assurance, training and annual skills review for the career staff. Sierra is in the process of formalizing the Quality Assurance process.

Future plans include operating room intubation skills review, training assignments and additional skills review.

Patient care contacts are divided among all of the paramedics. Most, but not all, of the paramedics work additional shifts for REMESA for additional patient contacts.

The Regional Emergency Medical Service (REMSA) has an exclusive transport franchise for Washoe County excluding the North Lake Tahoe Fire Protection District and Gerlach area. The North Lake Tahoe Fire Protection District (NLTFPD) and Gerlach have ambulances and patient transport. The NLTFPD provides paramedic service with cross trained firefighter/paramedics.

The REMSA contract specifies response times for pre-established zones. The contract provides for eight minute response times 90% of the time to the central core area of the city. Outside the core areas, response time standards change to fifteen to twenty minute response times or best effort zones. The contract is monitored by a REMSA Board with a Washoe County Department of Health representative.

Originally REMSA was established as an independent contract monitoring agency. REMSA advertised for vendors who could meet pre-established response time standards. In 1994 REMSA was not able to find bidders for the contract. REMSA then established a separate entity with the same officers and provided service.

The SFPD areas are all in either the fifteen to twenty minute or best effort response zones.

*Sierra Fire Protection District needs to establish a solid quality improvement program. In paramedic systems where the call volume is not significant paramedics lose the basic skills because they are not able to do them on a regular basis. Quality Improvement programs have shown to identify these issues, and provide remedial training to deal with skills that are not practiced on a regular basis.*

### **Fire Prevention within the Sierra Fire Protection District**

Fire Prevention activities and code enforcement for the Sierra Fire Protection District (FPD) is provided by a Fire Prevention Captain assisted by suppression staff. The District has one grant funded employee assigned to defensible space inspection within the District. The employee does inspections for wildland-urban interface vegetation mitigation programs.

The SFPD has an active Company Fire Inspection program that works with the Prevention Captain to assure fire and life safety to the residents, businesses, and visitors to the community. The Company Fire Inspection program is a system where on-call fire suppression fire crews are assigned specific fire and life safety inspections within the community. This is a fairly new program for the SFPD that started in 2007. In addition to the inspection, the engine companies also update suppression pre-plans.

Fire Prevention activities such as fire permits, construction plan review and inspections, built-in fire protection systems such as automatic fire sprinkler systems and fire alarm systems, are done within the Fire Prevention Captain working with Washoe County Building & Safety staff.

There was a total of 121 of fire inspections completed in 2008 in the SFPD. These inspections included: residential, industrial, commercial, retail, and other required inspections. In 2008, 23 voluntary inspections of residential structures were conducted. These inspections are done at homeowner's request. The District has a grant funded Defensible Space Inspector who has completed 1,657 defensible space inspections.

The District is currently engaged in the process of updating the building code and adding a Wildland Urban Interface component for adoption in the next 90-120 days.

2006 edition of the International Fire Code (IFC) was adopted by the Nevada State Fire Marshal's Office on September 18, 2009 and it is the fire code in use by the District. The District is currently reviewing this code and developing local amendments to the 2006 IFC. In addition, the SFPD falls under Washoe County's Ordinance 60. This document is attached as an appendix to this report.

The 2006 edition of the IFC is the most current fire code printed and adopted by the International Code Council. The IFC is printed by the International Code Council (ICC). The International Code Council, a membership association dedicated to building safety and fire prevention, develops the codes used to construct residential and commercial buildings, including homes and schools.

The SFPD offers many public education programs, fire safety programs, and has active Fire Safe Councils. Programs include: curbside chipping programs, evacuation and defensible space classes, yearly evacuation drills within the community, and the "Living with Fire" program. The District also offers other programs including: CPR classes, school programs, fire extinguisher training, campfire safety at local campgrounds, and other community and business activities. In 2008, the District had an estimated 10,000 community contacts that were made as a result of these programs.

Investigations of fire and other related incidents are conducted by staff of the SFPD. There are times when the District also uses the Nevada State Fire Marshal's Office for an investigation. Fourteen fire investigations were conducted in 2008 by District personnel

*Sierra Fire Protection District has done a good job of delivering public education programs. If Sierra Fire Protection District tracked their calls by census tracts and then viewed that information they could plan ahead for public education initiatives including those that deal with an aging community, trends in accidental ignitions, arson issues and slips and falls by seniors. Tracking calls and trends to specific information would enhance the effectiveness of Sierra Fire Protections Districts efforts.*

## **Communications**

Reno and Washoe primary 911 PSAP and emergency communications facility identified as ECOMM is located on the grounds of Washoe County's Regional Public Safety Training Center campus located north of Reno, east of US-395N at 5195 Spectrum Blvd, Reno NV.

This new campus and adjacent facilities were constructed in early 2000. The ECOMM 911/Dispatch Center became operational in 2003. ECOMM is located within a 2 story building that houses the Washoe County Emergency Operations Center on the 1<sup>st</sup> floor with the ECOMM Regional 911 Dispatch Center and related administrative offices on the 2<sup>nd</sup> floor.

The Dispatch Center appears to be fully NFPA1221 compliant with generator and UPS backup. In addition, the facility appears to be built to Essential Services Seismic Requirements although no specific engineering data was provided for this analysis. With an external radio tower, the grounding system appears to be adequate, but should be fully examined to determine if the R56 Grounding Standard has been met to protect the facility from transient grounding issues or lightning strikes. The 911 Dispatch Center's security is closely monitored by a closed circuit security system with an electronic gate and door access control. The facility co-exists on the 120 acre campus of the Regional Public Safety Training Center. The RPSTC operates under an inter-local agreement between most of

the public safety agencies in Washoe County and the Truckee Meadows Community College District.

The Washoe 911 Center is the primary Public Safety Answering Point (PSAP) and 911 Dispatch Center for 8 agencies in the greater Washoe County area. Those agencies include :

- Reno Police Department
- Reno Fire Department(Includes Truckee Meadows FPD)
- Washoe County Sheriff's Department
- Washoe County Search and Rescue
- University of Nevada Police Department
- Truckee Meadows Community College Police department
- City of Reno Marshal's Office
- Sierra Fire Protection District

However, Incline Village and the surrounding areas are dispatched from an independent dispatch center managed by the Washoe County Sheriff's Office utilizing the Washoe County Sheriff's Incline Substation as its facility. The Incline PSAP/911 Center also dispatched all fire and EMS 1<sup>st</sup> responder and ambulance transport services (fire based, not REMSA) for the North Lake Tahoe Fire District (Incline and adjacent areas).

Although the Incline area 911 Dispatch Center is an independent operation under the direct control of the Washoe County Sheriff's Department, they are technically linked with the ECOMM network for utilization of the Tiburon CAD functionally.

The City of Sparks also operates a separate 911 PSAP dispatch center for the Sparks Police and Fire Department. However, unlike the Sheriff's Incline Dispatch Center, Sparks relies on REMSA (Reno Emergency Medical Services Authority) to initiate pre-arrival EMS instructions and EMS transport services.

The primary ECOMM is a regionally based operation that is housed in a Washoe County leased facility. However the 911 center is under the jurisdiction of the City of Reno (Technology Department) for its day-to-day functions and operations. The 911 Center is staffed by the City of Reno employees (dispatchers), and is under the direction of a Center Manager (position currently vacant although temporarily filled internally) who reports to the City of Reno's Communications & Technology Director, Mr. Rick Vandenberg. Although managed by the City of Reno, various user groups and operations committee in the Washoe area provide input to the dispatch operation either directly or indirectly through staff representation. Individual agency operational change requests are generally coordinated directly with the Washoe Dispatch Center Manager or assigned staff.

ECOMM provided incident call activity for the year 2008 includes:

- Fire & EMS = 30,895 = 14% of total calls
- Law enforcement related= 184,014 = 86% of total calls
- 911 Calls Received= 59,405
- 911 wireless calls received = 101,120

The Reno Information Technology Department maintains most all the technology features of the 911 Dispatch Center through its own internal staff or external contract support. The Computer Aided Dispatch system (CAD) is manufactured by Tiburon Pubic Safety Software Solutions in Pleasanton, California. The CAD system is a robust law enforcement/fire based system that continues to evolve as the needs of the Washoe County area grows. Even though the Incline area is dispatched separately utilizing an independent facility located in Incline Village, the Tiburon CAD is linked to the Incline location for utilization of the centralized geo-file, run-database and CAD functionally.

The Tiburon CAD is a fully automated system that includes various interfaces to external devices such as;

- Push to talk radio ID (via 800MHz)
- Mobile Data Terminals (although not fully deployed regionally)
- Paging and fire station alerting
- E911 call transfer
- CAD Records Management (AKA Tiburon Mobile Reports)
- TDD/TTY
- AVL (although not fully utilized)
- Zetron (fire alerting via conventional fire pagers)
- Geofile

*Sierra Fire Protection District, through a contract with ECOMM should alter the dispatch system to develop fractile response times and geo code incident response to census tract areas. It is obvious from evaluating the call volumes that there is a discrepancy between information provided by Sierra Fire Protection District, ECOMM, and Washoe County dispatch centers.*

## Legal Authority

Nevada law consists of the Constitution of Nevada (the state constitution) and Nevada Revised Statutes. The Nevada Revised Statutes (NRS) are the current codified laws of the State of Nevada. The Nevada Supreme Court interprets the law and constitution of Nevada. The Statutes of Nevada are a compilation of all legislation passed by the Nevada Legislature during a particular Legislative Session. The Nevada Administrative Code (NAC) is the codified, administrative regulations of the Executive Branch. The Nevada Register is a compilation of proposed, adopted, emergency and temporary administrative regulations, notices of intent and informational statements. Nevada Supreme Court Opinions are the written decisions of the Nevada Supreme Court.

There are several chapters of the NRS that apply to Sierra Fire Protection District and the Truckee Meadows Fire Protection District.

In Title 22 - Cooperative Agreements by Public Agencies; Planning and Zoning; Development and Redevelopment there is Chapter 277 which addresses: Cooperative Agreements: State, Counties,

Cities, Districts and Other Public Agencies. This is the Chapter that allows the Washoe County to enter into cooperative agreements.

In Title 42 - Protection from Fire/Explosives, there are several Chapters that apply to Sierra Fire Protection District and Truckee Meadows Fire Protection District.

Chapter 472- State Forester/Fire Warden

Chapter 473- Fire Protection Districts Receiving Federal Aid

Chapter 474-County Fire Protection Districts

Chapter 475- Crimes and Responsibilities Concerning Fires

Chapter 476- Explosives and Inflammable Materials

Chapter 477- State Fire Marshal

### **Sierra Fire Protection District Stations and apparatus**

<b>Sierra Fire Protection District</b>	<b>Station Name</b>	<b>Address</b>	<b>City/Area</b>	<b>State</b>	<b>Zip Code</b>
SFPD 30	SFPD Station 30	3905 Old Hwy 395	Washoe Valley	NV	89704
SFPD 301	SFPD Station 301	345 Bellevue Rd	Washoe Valley	NV	89704
SFPD 321	SFPD Station 321	250 South Ave	Reno	NV	89506
SFPD 331	SFPD Station 331	11005 Longview	Reno	NV	89506
SFPD 35	SFPD Station 35	100S Garson Rd	Reno	NV	89439
SFPD 351	SFPD Station 351	165 Bridge St	Reno	NV	89439
SFPD 38	SFPD Station 38	16255 Mt Rose Hwy	Reno	NV	89511
SFPD 381	SFPD Station 381	16133 Mt Rose Hwy	Reno	NV	89511
SFPD 39	SFPD Station 39	4000 Joy Lake Rd	Reno	NV	89511
SFPD HQ	Headquarters	3905 Old Hwy 395	Reno	NV	89511

### **Apparatus assigned to Stations**

Station 30- Engine 30, Brush 30, Water Tender 30

Station 301- Engine 301, Brush 301, Water Tender 301, Rescue 301

Station 321- Patrol 321, Brush 321

Station 331- Brush 331, Patrol 331, Water Tender 331



Station 35-	Engine 35, Brush 35
Station 351-	Engine 351, Water Tender 351, Brush 351
Station 38-	Engine 38, Brush 38, Tender 38
Station 381-	Engine 381, Brush 381, Rescue 381

## References

Description of Fire Service Deployment Assets  
March 2008  
Emergency Services Consulting Incorporated

## Automatic and Mutual Aid

### *Automatic Aid*

There are a vast amount of fire resources available within Washoe County. Automatic Aid agreements have been established between two or more fire departments in advance of the emergency. The Sierra Fire Protection District has Automatic Aid agreements with the North Lake Tahoe Fire Protection District, the Reno/Truckee Meadows Fire Departments, Sparks Fire Department, US Forest Service and the Nevada Department of Forestry.

### *Mutual Aid*

Mutual aid is the assistance from one fire department to another when specific equipment has been requested after the initial dispatch to an emergency incident. The Sierra Fire Protection District has mutual aid agreements with the following agencies:

- Sparks Fire Department
- Reno/TMFPD
- North lake Tahoe Fire Protection District
- Nevada Air National Guard
- United States Forest Service
- Bureau of Land Management
- Carson City Fire Department
- Tahoe Regional Fire Chief's
- Storey County
- Sierra County (California)
- Cal Fire

The Mutual Aid system requires that the following questions be answered:

- Type of equipment requested- structural engine, brush truck, aerial truck, etc.



- When is the equipment needed-immediately, planned need, stand-by, etc.
- Where is the equipment needed-to the scene, at a staging area, to a specific station for coverage, etc.
- Phone number for agency requesting assistance.
- Radio frequency assignment designated by the requesting agency.

Fire Apparatus that exists between fire agencies in Washoe County

Types of Apparatus	Estimated Numbers of Apparatus
Type 1 Engines (Structure)	74
Aerial Ladder Trucks	6
Brush Engines (Wildland)	29
Water Tenders	10

### Infrastructure within the SFPD

#### *Highways and Other Access*

Primary access to Sierra Fire District is Interstate 80, the main west-east corridor in Washoe County. US Highway 395 dissects the County in a North- South direction and Franktown Road and Old US Highway 395. Numerous common carriers provide interstate and intrastate service.

#### *Fire Flow*

Fire Flow in Washoe County is handled by the Department of Water Resources. The guidelines for fire flow can be found in the Nevada Administrative Code 445A.6672 Existing systems: Minimum capacities; minimum pressure and velocity of water; total capacity of groundwater systems; timely completion of water projects. (NRS 445A.860) A supplier of water for an existing public water system shall:

1. Ensure that the public water system maintains a sufficient capacity for the development and treatment of water, and a storage capacity of sufficient quantity, to satisfy the requirements of all users of the public water system under the conditions of maximum day demand and peak hour demand.
2. Ensure that the residual pressure in the system is:
  - a. At least 20 psi during conditions of fire flow and fire demand experienced during maximum day demand.

Currently there are no planned water system improvements in the Sierra Fire Protection District's boundary. Truckee Meadows Fire Protection Districts boundaries were combined into the City of Reno's boundaries, so no detailed analysis was able to be conducted.

*Sierra Fire Protection District has water tenders available and built into the dispatch run cards for areas that are deficient in water supply.*

### **Growth within the SFPD**

The District has two developments with additional expansion opportunities. They are Arrowcreek and Montreaux. There is a proposed plan for a 640 home development called Matera Ridge that is currently undergoing review

### **Special Challenges for the Fire and Life Safety System facing the SFPD**

#### *Senior Citizen*

The Elderly in Washoe County present many challenge to fire service agencies. Generally, Fire Service agencies respond to a large number of medical emergencies for the elderly. Nevada has long ranked last or in the bottom five of all states related to the Healthy People 2010 goals and major health indicators. The leading causes of death in Nevada among older persons were diseases of the heart, cancers, and chronic lower respiratory diseases. In 2003, 355 deaths of persons 55+ were caused by influenza and pneumonia; 307 deaths were due to Alzheimer's Disease, and 143 chronic liver disease and cirrhosis. Death due to car accidents are highest among older adults than any other age category.

#### **Reference**

Washoe County Senior Citizens Strategic Plan

Institution and Group Quarters Population for persons 65+ in Washoe County, 2005

#### *Flood Hazard*

##### Causes of Flooding

Flooding occurs when climate (or weather patterns), geology and hydrology combine to create conditions where river and stream waters flow outside of their normal course and "overspill" beyond their banks. In Washoe County, the combination of these and

other factors, create chronic seasonal flooding conditions. Flooding is most common December through March in Washoe County when storms encompassed with warmer temperatures and heavy rainfall come over the snow-packed Sierra Nevada mountains.

Larger floods result from the heavier rains that continue over the course of several days, incorporated with by snowmelt at a time when the soil is near saturation from previous precipitation. Riverine flooding and urban flooding are the two types of flooding that primarily affect Washoe County. Riverine flooding is the overbank flooding of rivers and streams, the natural process of which adds sediments and nutrients to fertile floodplain areas. Urban flooding results from the conversion of land from fields or

vacant land to buildings, parking lots and roads, though which the land loses its ability to absorb rainfall and the water runoff fro the storms causes increased water in the low-lying areas.

*Sierra Fire Protection Flood Zone concerns include Washoe Valley and Verdi.*

## Reference

Washoe County Website- Flood Awareness

### *Water Rescue Scenarios*

Water rescues can be particularly dangerous for rescuers. Conditions that can affect water rescue operations include volume and velocity of water, floating debris, unusual drop-offs, water depth and hydraulic effects, as well as dangers that may be hidden below the surface that can result in rescuers becoming trapped in rocks or other debris, or being cut by glass, metal and other items on the river bed.

Swift water situations can carry a person away quickly, and often the temperature of the water will quickly lead to hypothermia that can incapacitate anyone who ventures into or falls into the Truckee River. Hypothermia occurs when the body's core temperature is dramatically lowered. Among other results, there is a loss of strength and muscular coordination as well as mental confusion and often erratic behavior that can all combine to overcome the victim's swimming skills, and ultimately lead to drowning.

*Sierra Fire Protection District has the Truckee River running through the Verdi area, which is their primary water hazard. Sierra's training officer has become a swift water rescue instruction and has provided this training to 1/3 of the department. Firefighters are expected to conduct a variety of skills that include medical, firefighting and specialized rescue, these lesser used skills sometimes tax an organization to keep the personnel proficient.*

### *Earthquakes*

The Reno-Carson City urban corridor is the second most populated region in Nevada, and lies in one of the most seismically active parts of the State. There are at least 30 faults that could cause damage in the Reno-Carson City urban corridor. The probability of at least one magnitude 6 or greater event in the next fifty years is between 34 and 98%. The probability of at least one magnitude 7 or greater event in the next fifty years is between 4 and 50%. Hazards include intense ground shaking, ruptures of the ground, liquefaction, landslides, and ancillary problems, such as fires and hazardous waste spills.

Source- Nevada Bureau of Mines and Geology

*Sierra Fire has some FEMA training for general rescue and high angle rescues. Additional resources must come from Reno/TMFPD urban search and rescue capabilities or NLTFPD resources.*

#### *Hazardous Materials*

The transportation and storage of hazardous materials is clearly a regional issue. A large quantity of hazardous products are transported on highways and railways where the potential for release of this material into the environment represents a potentially significant public health risk.

*Sierra Fire has first responder Hazardous Material capabilities, but must rely on the regional Hazardous Materials Team which includes Sparks, Reno and TMFPD*

#### *Wildland Fire and fires in the Wildland/Urban Interface*

Wildland/urban interface refers to the geographical areas where formerly “urban structures—mainly residences—are built in close proximity to the flammable fuels naturally found in wildland areas, including forests, prairies, hillsides and valleys. The results can be aesthetically desirable...or disastrous”

As urban areas expand into wildland areas and as an increasing number of homes are built near wildland areas, the conflicts associated with wildland fire become more commonplace. Just as wildland fires threaten people and their property, human caused fires threaten wildlands. Thus homeowners and developers benefit by knowing the risks and protection strategies related to home development in wildlands.

A dream home built in an idealistic wildland setting can be razed by fire in a matter of minutes. Likewise, the exemplary scenery that attracted homeowners to the setting can be altered, often because of the inadvertent action of the homeowner.

## Eight Components of Standards of Cover Systems

The Standards of Cover systems approach consists of the following eight components:

- Existing deployment
- Risk identification
- Risk expectations
- Service level objectives
- Distribution
- Concentration
- Performance and reliability
- Overall evaluation

### Existing Deployment Policies

All agencies have an existing policy, even if it is undocumented or adopted by the locally responsible elected officials. Originally, stations and equipment were located to achieve certain expectations. How and why they were sited needs to be historically understood, described and contrasted to proposed changes.

**Table for Assessing Land Use Against Response Needs**

Land Use Category	Definition	Use Rate & Risk Factors	Travel Time	Concentration	Effective Response Force
<b>Single Family Residential</b>	Single family dwellings  Small lot less than one acre	High use for medical aids  Low frequency of fire  24-hour a day problem	4 minutes 59 seconds or under 5 minutes 90% of the time	7 minutes 59 seconds or under 8 minutes	Minimum of 13 personnel within 10 minutes

Land Use Category	Definition	Use Rate & Risk Factors	Travel Time	Concentration	Effective Response Force
<b>Multi-family Dwellings</b>	Under 10 Apts/Units	Same as Residential			
	11 to 25 Apts/Units	Same as Residential			
	Over 25 Apts/Units	Somewhat higher than residential			Minimum of 15 personnel within 10 minutes
<b>Planned/Centralized Commercial (non-assembly)</b>	Under 5,000 sq ft	Low for EMS Moderate for Fire	3 minutes 49 seconds 90% of the time	7 minutes 59 seconds or under 8 minutes	Minimum of 15 personnel within 10 minutes
	5,000 to 20,000 Square Feet	Very low for EMS High for fire impact			Minimum of 15 personnel within 10 Minutes
	Over 20,000 Square Feet	Very low for EMS Major loss potential for fire			Minimum of 21 personnel within 12 Minutes
<b>Public Assembly</b>	Under 50 Occupants	Low frequency Moderate impact	3 minutes 49 seconds 90% of the time?	7 minutes 59 seconds or under 8 minutes?	Minimum of 15 personnel within 10 minutes
	Over 50	Very low frequency Very high impact	3 minutes 49 seconds 90% of the time	7 minutes 59 seconds or under 8 minutes	Minimum of 21 personnel within 12 Minutes

Land Use Category	Definition	Use Rate & Risk Factors	Travel Time	Concentration	Effective Response Force
<b>Industrial</b>	1,000 gpm or less	Industrial EMS High loss ratio	Level of Acceptable Risk		Minimum of 17 personnel
	1,001 to 3500 gpm	Industrial EMS Moderate loss ratio			Minimum of 21 personnel
	3,501 to 5,000 gpm	Industrial EMS Very high loss ratio			Minimum of 24 personnel
<b>Single Family (large lots)</b>	Lot sizes 2 to 5 acres	EMS priority Fire moderate	6 minutes 59 seconds 90% of the time	10 Minutes	Minimum of 15 personnel within 10 minutes
<b>Rural Development</b>	Lot sizes over 5 acres	EMS priority Fire is infrequent occurrence	20 minutes	30 minutes	None Designated
<b>Wildland Area</b>	No subdivided parcels Size expressed in square acres or square miles	Rescue issues Containment of ground fuels	30 minutes	1 Hour	None Designated

## Description of Published Standards

National Standard for Comparison	Organization
Minimum effective company staffing is 4 firefighters	Dallas FD Study, Seattle FD Study, NFPA Standards, Federal OSHA
Engine co. within 1.5 miles of built upon areas	Insurance Services Office (ISO)
Ladder truck within 2.5 miles of built upon areas	Insurance Services Office (ISO)
Staffed ladder truck should be available if 5 or more buildings exceed 35' in height or fire flow exceeds 3500 gpm.	Insurance Services Office (ISO)
Average fire-ground staffing to be 15 firefighters for moderate risk fires (single family residential) and up to 53 for high risk fires (industrial, high risk unprotected residential, etc.) <i>Called Critical Tasking</i>	Center for Public Safety Excellence, Commission on Fire Accreditation International
National average of on-duty personnel = .48 per 1,000 population	International City/County Management Association (ICMA)
National average total uniformed personnel = 1.59 per 1,000	International City/County Management Association (ICMA)
Arrive at structure fire prior to flashover (typically 5 to 7 minutes from ignition)	FEMA National Fire Academy
Arrive at EMS call within 4 to 6 minutes of cardiac or respiratory arrest	American Red Cross

## Sierra Fire Protection District Comparison

National Standard for Comparison	Sierra Fire Protection District
Minimum effective company staffing is 4 fire-fighters	Meets this Standard
Engine co. within 1.5 miles of built upon areas	Does not meet this Standard consistently
Ladder truck within 2.5 miles of built upon areas	Does not meet this Standard without outside assistance
Staffed ladder truck should be available if 5 or more buildings exceed 35' in height or fire flow exceeds 3500 gpm.	Does not meet this Standard without outside assistance
Average fire-ground staffing to be 15 firefighters for moderate risk fires (single family residential) and up to 53 for high risk fires (industrial, high risk unprotected residential, etc.) <i>Called Critical Tasking</i>	Does not meet this Standard without outside assistance
National average of on-duty personnel = .48 per 1,000 population	SFPD population 25,000, exceeds standard by 1 person
National average total uniformed personnel = 1.59 per 1,000	SFPD exceeds the number
Arrive at structure fire prior to flashover (typically 5 to 7 minutes from ignition)	SFPD alone cannot meet this standard
Arrive at EMS call within 4 to 6 minutes of cardiac or respiratory arrest	SFPD can meet this standard in certain circumstances



## Sierra Fire Protection District Apparatus Response

Type of Event-First Alarm Assignment (Typically know as a still alarm)	Apparatus Assigned to Event
Medical Emergency, Vehicle Fire, Smoke Check	Single Sierra Engine Company with Staffing of 4 including a paramedic
Medical Emergency, Vehicle Fire, Smoke Check in an area with Volunteer Coverage	Single Sierra Engine Company with Staffing of 4 and the appropriate Volunteer Fire Apparatus with undetermined Staffing in areas with Volunteer Fire Companies

Type of Event- First Alarm High Risk	Apparatus Assigned to Event
	Sierra Engine with Staffing of 4, Sierra Battalion Chief, Safety Officer during 8-5 and call back after hours
	Sierra Engine with Staffing of 4, Sierra Battalion Chief, Safety Officer during 8-5 and call back after hours, and Volunteers Fire Apparatus with undetermined Staffing in areas with Volunteer Fire Companies

Second Alarm or Full Alarm Assignment	Apparatus Assigned to Event
Structure Fire, Wildland Fire, Hazardous Material Event, Specialized Rescue	2 Sierra Engines with Staffing of 4, Battalion Chief, Reno/TM Engine with 4, Safety Officer call back
Structure Fire, Wildland Fire, Hazardous Material Event, Specialized Rescue	2 Sierra Engines with Staffing of 4, Battalion Chief, Reno/TM Engine with 4, Reno/TMFPD Safety Officer, and Volunteers Fire Apparatus with undetermined Staffing in areas with Volunteer Fire Companies

Event	Apparatus Assigned to Event
Second Alarm Brush Fire	Sierra Engine with 4, Two Sierra Brush Engines with 4 each, Safety Officer, Water Tender with station staff or volunteers
Second Alarm Brush Fire in An Area with Volunteers	Sierra Engine with 4, Two Sierra Brush Engines with 4 each, Safety Officer, Water Tender with station staff by reducing staffing by one on initial response engine and Volunteer Fire Apparatus with undetermined Staffing in areas with Volunteer Fire Companies

## BUILDING RISK IDENTIFICATION AND ASSESSMENT

### RISK ASSESSMENT METHODOLOGY

Sierra Fire Protection District must assess risks based upon the potential frequency (probability of an incident occurring) and consequence (potential damage should an event occur). For example, a terrorist act has a low probability; however, if a terrorist act occurs, the damage and the psychological impact are potentially very high. This same outlook regarding risk assessment can also be applied to natural disasters. For example, an earthquake generally does not hit the same communities every year; but, if it does strike, the damage can be great. Conversely, medical emergencies happen every day. The overall potential damage from medical emergencies to the community as a whole is not nearly as significant as that from an earthquake or other natural disaster (though these individual incidents greatly affect those requiring the service). To design future deployment strategies, the department must be able to compare the potential frequency and potential damage of events that may affect the community and service area. Risk management is the analysis of the chance of an event occurring and the resulting damage that could occur as a result of the event.

#### Probability Matrix

High Probability Low Consequence	High Probability High Consequence
Low Probability Low Consequence	Low Probability High Consequence

For example: structure fires are relatively infrequent in comparison to medical incidents in the Sierra Fire Protection District and its service areas; however, the loss of subsequent dollars, loss of irreplaceable items, and loss of business or jobs make the consequences of such fires high; activation of automatic fire alarms is high probability with low consequence; earthquakes or a large hazmat incident may be infrequent but represent a large potential loss to life and property. Comparatively, a dumpster fire may be a high probability but have little consequence outside of the fire response. With an understanding of the different levels of probability and consequences, proper strategic planning in respect to risk management, and resource deployment can take place. The challenge in community risk management does not lie solely in the work necessary to assess the probabilities of an emergency event in a community, but in the political arena as well. It is the policymakers who will determine the level of service to be delivered to the area being served. The evaluation of fire risks must take into account the frequency and severity of fires and other significant incidents. Determining risk by analyzing past statistical information and projected growth in the service area is essential to the development of a workable five-year fire department strategic plan.

The relationships between probability and consequence and the community's adopted service level goals determine the needed concentration and distribution of resources. Distribution is the number of resources placed throughout the District. Concentration is the number of resources needed in a given area within the District. This varies depending on many factors including the number of events (calls) for service; the risk factors of the area; the availability, reliability, and time of arrival of secondary responding units; etc. A challenge will be to fund the proper balance for the distribution and concentration of resources needed to meet the service level goals today and in the future as the District and service areas continue to grow.

## RESOURCE MANAGEMENT

Building Risk Identification and Assessment consists of three elements:

- **Fire Flow:** The amount of water to control the emergency, which is based on structure, contents and exposures, *and*
- **Probability:** The likelihood that a particular event will occur within a given period of time. An event that occurs daily is highly probable. An event that occurs only once in a century is very unlikely. Probability then is an estimate that an event will occur and a prediction that it will be very close by in time, or sometime off in the future, *and*
- **Consequence:** There are two components - Life Safety (the amount of emergency personnel and equipment to rescue or protect the lives of an occupant from life threatening situations); and Economic Impact (the losses of property, income or irreplaceable assets).

*Building Risk Assessment* is performed at three levels of measure:

- **Occupancy Risk:** defined as an assessment of the relative risk to life and property resulting in a fire inherent in a specific occupancy or in a generic occupancy class.
- **Demand Zone:** defined as an area used to define or limit the management of a risk situation. A Demand Zone can be a single building, or a group of buildings. It is usually defined with geographical boundaries and can also be called fire management areas or fire management zones. Sometimes Demand Zones are a department's data reporting areas from which historical workload can be defined, or DZ's could be a Planning Department data area that could be used to identify and quantify risks with the area.
- **Community:** defined as the overall profile of the community based on the unique mixture of individual occupancy risks, Demand Zone risk levels and the level of service provided to mitigate those risk levels.

EMS and specialty incident response risk assessment and outcome expectations should also be performed using the criteria from those disciplines. For example, an EMS risk category could be trauma patients, with an expectation to stabilize and transport trauma patients to a designated trauma center within one hour of the accident occurring.

*Sierra Fire Protection District does not track emergency response or do planning by Census Tract areas. Related statistical information, demographics, economic, housing, as well as other socio-economic factors such as per capita income, the percent of population living below poverty line, and unemployment rates are factors that should be taken into account when assessing community risk. Studies indicate the socio-economic factors have a direct relationship on the number and severity of fire incidents. Fires occur disproportionately in areas, which are economically depressed and are directly linked to the ability to afford appropriate housing, fire safety devices, and lack of general maintenance. All are contributing factors to higher rates of fire in areas with lower per capita income. If a fire agencies emergency response is keyed to Census Tracts then a fire agency can model trends such as occurrences of cardiac arrest, which would dictate the use of automatic defibrillation. Census tracts are also useful for community fire education, arson investigation and Wildland Urban Interface programs. Demographics play a major role for a fire officer to assess and react to the changes of his/her community which includes fire stations, fire apparatus, fire prevention initiatives, and trend.*

### Sierra Fire Protection District Major Risk Properties

#### SFPD District 30

Type of Risk	Hazards within Risk
Storage Facility	Possible Hazardous Materials, High Fire Load, Threat To Exposures
Church	Difficult Firefighting problem, Life Safety
Restaurant	Life Safety, Access, Loss of taxes

#### SFPD District 35

Type of Risk	Hazards within Risk
Large Manufacturing Plant	Difficult Firefighting Problem, Life Safety, Possible Hazardous Materials, Loss of taxes
Power Plant	Critical Community Infrastructure, Difficult Firefighting Problem, Hazardous to Firefighters
School	Critical Community Infrastructure, Life Safety Hazard during School hours

## SFPD District 38

Type of Risk	Hazards within Risk
Power Plant	Critical Community Infrastructure, Difficult Firefighting Problem, Hazardous to Firefighters
Strip Mall	Difficult Firefighting Problem, Possible Hazardous Materials, Loss of taxes
Ski Resort	Difficult Firefighting Problem, Threat to interface during non-ski Season, Loss of taxes
Churches	Difficult Firefighting problem, Life Safety
Hospital	Critical Community Infrastructure, Life Safety Hazard, Possible Hazardous Materials
College Campus	Critical Community Infrastructure, Life Safety Hazard during School hours
Schools	Critical Community Infrastructure, Life Safety Hazard during School hours
Restaurants	Life Safety, Access, Loss of taxes
Country Club	Life Safety, Access, Threat to the interface, Loss of taxes

## Reference- SFPD Chief Officers

General Risks within the Sierra Fire Protection District, this list does not include every possible scenario, just the most common risks.

Type of Risk	Hazards within Risk
Residential Structure Fires	Life Safety, Exposure risks, Firefighter Safety, Property loss, Loss of tax base
Multi Family Structure Fires	Life Safety, Exposure risks, Firefighter Safety, Property loss, Loss of tax base
Commercial Structure Fires	Life Safety, Exposure risks, Firefighter Safety, Property loss, Loss of tax base
Natural Disasters	Life Safety, Possible Multiple simultaneous events, Long duration Event, Long recovery, Loss of Tax base, Possible Hazardous Materials
Man- Made Disasters	Life Safety, Possible Multiple simultaneous events, Long duration Event, Long recovery, Loss of Tax base, Possible Hazardous Materials
Medical Emergencies	Infectious control concerns, Firefighter safety
Hazardous Materials	Life Safety, Long duration Event, Long recovery, Complex issues with Possible public exposure
Urban Search and Rescue	Life Safety, Possible Multiple simultaneous events, Long duration Event, Long recovery, Loss of Tax base, Possible Hazardous Materials, Specialized equipment needs
Wildland Fires	Life Safety, fast moving event, costly use of resources, can be long duration event, Long recovery, Threat to watershed
Urban Interface Fires	Life Safety, fast moving event, costly use of resources, can be long duration event, Long recovery, Threat to watershed, Possible loss of Significant amounts of homes, Firefighter Safety

## Risk Expectations

After we know what the risks are in a community, what do we expect to do about them? Respond to emergencies in them? Deliver prevention and education programs to minimize these risks? Before we set response expectations, the system should outline what it is doing and could additionally do, to control risks. For those risks that cannot be controlled to a level below that requiring a response, we then set outcome expectations for emergency response.

Sierra Fire Protection District has taken an aggressive response to providing education to the community, it is reported that in 2008 they have devoted time for 10,000 customer contacts.

Identified Risk	SFPD Preventative Response to the Risk
General Knowledge	Fire Safety programs
Wildland Risk	Active Fire Safe Councils
Wildland Risk	Curbside Chipping Program
Wildland Risk	Evacuation and Defensible Space Programs
Wildland Risk	Evacuation Drills
Wildland Risk	Living with Fire Classes
Cardiac Arrest	CPR courses
Ignorance of Fire Issues	School Fire Safety Courses
Small Fire Incidents	Fire Extinguisher Courses
Small Fire Incidents	Campfire Safety

## Service Level Expectations

After understanding the risks present in the community, what control measures do the citizens and elected officials expect? For example, does the agency confine the fire to the compartment of origin, area of origin, floor of origin, or building of origin? Some agencies in sparsely populated areas with long response times like 30 minutes or more might have to accept (not like) an exposure level of service where the building fire does not spread to the adjoining forest and start a conflagration. In EMS we might expect to get a trauma patient to the designated trauma center within the first hour. Each risk category found in a community should have an outcome expectation developed for it. Risks other than structure fires are typically EMS, special rescue like confined space, hazardous materials, airports and airplanes, etc.

## EVALUATING FIRE SUPPRESSION CAPABILITIES

Firefighters encounter a wide variety of conditions at each fire. Some fires will be at an early stage and others may have already spread throughout the building. This variation in conditions complicates attempts to compare fire department capability. A common reference point must be used so that the comparisons are made under equal conditions. In the area of fire suppression, service-level objectives are intended to prevent the flashover point, a particular point of a fire's growth that makes a significant shift in its threat to life and property. Fire suppression tasks required at a typical fire scene can vary a great deal. What fire companies must do, simultaneously and quickly, if they are to save lives and

limit property damage, is to arrive within a short period of time with adequate resources to do the job. Matching the arrival of resources within a specific time period is the objective of developing a comprehensive Standards of Cover integrated risk management plan.

### The Stages of Fire Growth

Virtually all structure fires progress through a series of identifiable stages.

**Stage 1: The Ignition Stage**—The ignition of a fuel source takes place. Ignition may be caused by any number of factors, from natural occurrences such as lightning to premeditated arson.

**Stage 2: The Flame Stage**—The fuel initially ignited is consumed. If the fire is not terminated in this stage, the fire will progress to the smoldering stage or go directly to flashover.

**Stage 3: The Smoldering Stage**—The fuel continues to heat until enough heat is generated for actual flames to become visible. It is during this stage that large volumes of smoke are produced and most fire deaths occur. Temperatures rise throughout this stage to over 1,000 degrees Fahrenheit in confined spaces, creating the hazard of “backdraft” or smoke explosion. This stage can vary in time from a few minutes to several hours. When sufficient oxygen is present, the fire will progress to the free-burning phase.

**Stage 4: Free Burning or “Flashover” Stage**—The fire becomes free burning and continues to burn until the fire has consumed all contents of the room of fire origin, including furnishings, wall and floor coverings, and other combustible contents. Research into the flashover phenomenon has yielded criteria that precisely measure when flashover occurs; however, any exact scientific measurement in the field is extremely difficult. Observable events that would indicate a flashover are “total room involvement” and “free burning.” These indicators are easily observable by firefighting personnel and the public and can be easily recorded and retrieved for future evaluation. Both scientific tests and field observations have shown when flashover is experienced, it has a direct impact on fire protection and the ability of the emergency services system.

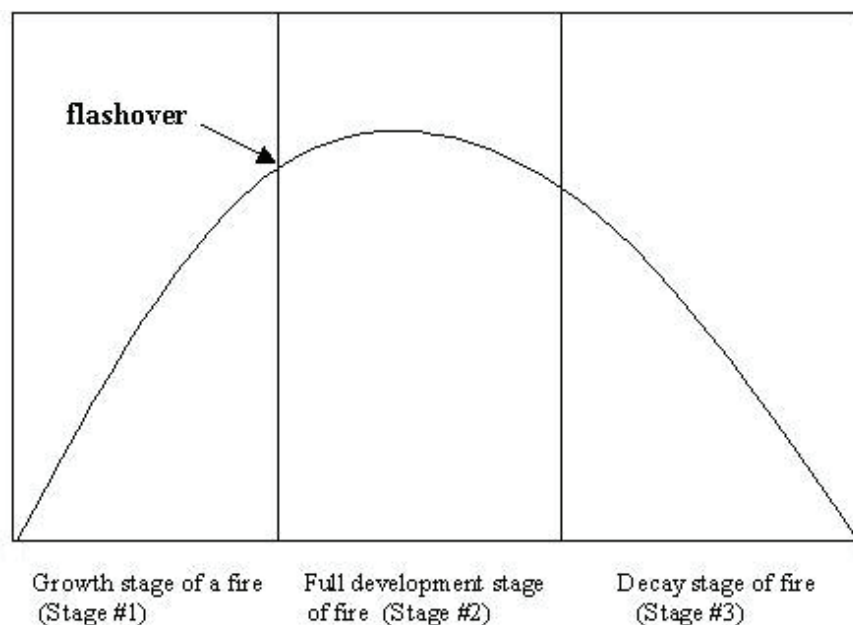
- a. Flashover occurs at a temperature between 1,000 and 1,200 degrees Fahrenheit. These temperatures are well above the ignition points of all common combustibles in residences, businesses, and industries. When this temperature range is reached, all combustibles are immediately ignited. Human survival after this point is highly improbable without specialized protective equipment.
- b. At the point of flashover, lethal fire gases (carbon monoxide, hydrogen sulfide, cyanide) increase explosively. People exposed to these gases, even when not directly exposed to the fire, have drastically reduced chances of survival.
- c. Flashover can occur within a relatively short period of time. Precisely controlled scientific tests indicate that flashover can occur in as little as two minutes from the flame stage. On the other hand, field observations of actual fires indicate that total room involvement can take as long as 20 minutes or more. There is no way to ascertain the time to flashover since it is not possible to determine when a fire started. Nevertheless, a correlation can be drawn between flashover and the entire fire protection system. As suggested previously, the number of times that fires are controlled before flashover depends on the entire fire protection system and is not solely dependent on emergency response forces. Built-in fire protection, public education, extinguishment by citizens, and even the type of fuel on fire are all factors that affect flashover. Even when fires are not extinguished by firefighting forces, these personnel often provide

other services, ranging from smoke removal to the restoration of built-in fire control systems. The objective is all components of the fire protection system, from public education to built-in fire protection to manual fire suppression, are maintained at a level to provide adequate service and the performance of each is periodically evaluated. Flashover is a critical stage of fire growth, as it creates a quantum jump in the rate of combustion and a significantly greater amount of water is needed to reduce the burning material below its ignition temperature. A fire that has reached flashover often indicates it is too late to save anyone in the room of origin, and a greater number of firefighters are required to handle the larger hose streams needed to extinguish the fire. A post-flashover fire burns hotter and moves faster, compounding the search-and-rescue problems in the remainder of the structure at the same time more firefighters are needed for fire attack.

### The Significance of Flashover

Pre-Flashover	Post-Flashover
Limited to one room	May spread beyond one room
Requires smaller attack line	Requires larger, more attack lines
Search and rescue is easier	Compounds search and rescue
Initial assignment can handle	Requires additional fire companies

**Flashover Time-Temperature Curve**





## Flashover Time-Temperature Curve

Staffing and equipment needs can be reasonably predicted for different risk levels and fire stages. The correlation of staffing and equipment needs with fires according to their stage of growth is the basis for response coverage. The goal is to maintain and strategically locate enough firefighters and equipment so a minimum acceptable response force can reach a reasonable number of fire scenes before flashover and intercede in critical medical emergencies. To minimize risk, the department strives to extinguish small fires quickly before they reach flashover potential to minimize risk and to mitigate medical emergencies quickly to reduce cardiac death. As flashover is such a significant fire event, preventing this stage of fire behavior is imperative. Time is a key factor in this effort. Once flashover potential is reached, an exponential increase occurs not only in the rate of combustion, but in the amount of resources necessary to mitigate the fire emergency. The Washoe County Board of County Commissioners has already established a Service Level Objective with the creation of the Washoe county Established Fire and EMS Response Times. The Chart below outlines those response goals. The problem with these response time goals is the lack of accurate measurement. Sierra Fire Protection District does not have the capability currently to evaluate Fractile Response times. Many fire departments report average response times while others report *fractile* response times. Average response times have been increasingly less used by the emergency service industry because small numbers of very short or long responses—often recorded in error—can distort the results. Also, the public is interested in how fast a system responds in most cases (fractile) rather than usually (average). More and more departments are adopting the 90<sup>th</sup> percentile for reporting response times (mostly due to NFPA 1710's use of this measure). A fractile response time of x at the 90th percentile means that units respond in x minutes, or less, 90 percent of the time. The remainder beyond the compliance fractile (90th percentile in this case) is the operational tolerance for the system, meaning the system is designed with the understanding that 10 percent of the calls will have response times that exceed the target.

### Washoe County Established Fire and EMS Response Times\* May 2007

General Rural	Fire- EMS Response	20 + Minute Response Time
Rural Lands	Fire- EMS Response	10-20 Minute Response Time
Suburban Lands	Fire- EMS Response	5-10 Minute Response Time
Urban Lands	Fire –EMS Response	5 Minute Response Time

\*Response time is measured from the time the initial call is received until the arrival of the first emergency vehicle

Source: Washoe County Comprehensive Plan, Land Use/Transportation Element, May 2007

*Lack of accurate data makes it impossible to evaluate response times and to determine if the Sierra Fire Protection District meets the Board of County Commissioners time frames.*

## EVALUATING EMS CAPABILITIES

Additionally, survival of cardiac death or in a fire preventing flashover is often time driven. The brain can only be without oxygen for a short period of time, i.e., four to six minutes. Rapid intervention is necessary to prevent brain death from occurring. From an emergency medical perspective, the service-level objective typically is to provide medical intervention within a six-minute timeframe, as brain damage is very likely at six minutes without oxygen. However, in a cardiac arrest situation, survivability dramatically decreased beyond four minutes without appropriate intervention. Intervention includes early recognition and bystander CPR. The research recommends using the Utstein reporting criteria for outcomes research and capture of the following time stamps/points in the cascade of events in an EMS call that should be tracked. Early defibrillation is often called the critical link in the chain of survival because it is the only way to successfully treat most sudden cardiac arrests. When cardiac arrest occurs, the heart starts to beat chaotically (fibrillation) and can not pump blood efficiently. Time is critical. If a normal heart rhythm is not restored in minutes, the person will die. In fact, for every minute without defibrillation, the odds of survival drop seven to ten percent. A sudden cardiac arrest victim who is not defibrillated within eight to ten minutes has virtually no chance of survival. The shortest possible response times create the highest probabilities of resuscitation. An important evaluation point lost on most agencies is the time that crews reach patient side. Often the clock stops when the vehicle arrives or stops at the address. The key to a successful outcome is the point the patient is actually contacted. In larger complexes or at very large homes located within gated communities, this time period can be substantial and can most certainly affect the outcome due to delayed intervention.

*Sierra Fire Protection District has paramedics on their first responder career engine companies, this delivers paramedics to the scene of a medical emergency faster than solely relying on the REMSA system. The issues that exists in a system were first responders arrive minutes before a transport unit is what is in the best interest of the patient, to stabilize the patient and await a responding ambulance or transport that patient as soon as possible. Sierra Fire Protection District does not have internal transportation options.*

### Event Initiation

The point at which factors occur that may ultimately result in an activation of the emergency response system; or the time period in which an individual has clearly identified that there is a threat to life and property and that remedial action must be taken immediately or there will be definable losses.

Precipitating factors can occur seconds, minutes, hours, or even days before a point of awareness is reached. A patient who ignores chest discomfort for days until it reaches a critical point, at which the patient makes a decision (point of Awareness) to seek assistance. Rarely is it possible to quantify the point at which event initiation occurs.

### Emergency Event

The point at which an awareness of conditions exists that requires an activation of the emergency response system. Considered the Point of Awareness, it may be the recognition by an individual that assistance is needed, or it may consist of a mechanical or electronic recognition of an event such as smoke or heat detector activation.

### Alarm

Alarm is defined as the **period of time** in which a human being or mechanical device takes to detect a set of circumstances that require response on the part of public safety forces to locate, access and

begin to communicate with a public safety agency that is required in order to mitigate the emergency. Alarm notification time includes the dialing of telephones, the completing of circuits and all elements that are required for the transmission of coded messages or electronic impulses in order for the receiving party to identify that a state of emergency exists.

Alarm notification is distinguished from the normalcy state by virtue of the fact that the individual who is aware of the emergency realizes they must have extra assistance or that the mechanical device such as heat detectors, smoke detectors and sprinkler systems reach their minimum threshold and operate. This element also includes the activation of equipment to alarm receiving facilities such as Central Station and third-party providers. This is when the emergency is reported.

### **Notification**

Commencement of notification is defined as the ***point in time*** when the first electrical impulse or indicator that can be identified and recorded by the public safety agency. This is the agency that is responsible to act/respond and start collection of hard data. In the Sierra Fire Protection District emergency calls first go to the PSAP (Public Safety Answering Point), which is ECOMM.

### **Alarm Processing or Dispatch Time**

Alarm processing time is defined as the ***period of time*** that is required for the communications center to identify the fact that an emergency is in progress, collect the information pertinent to making the appropriate dispatch and access the methodology used by the agency to deploy its resources.

Alarm processing time is essentially the entire time interval between realization that an emergency is in existence up to the point that this information is retransmitted via the internal alarm system to the attention of the specific agency's resources. The benchmark for this element of response time is 95% of all alarms will be dispatched within a 60 second time frame.

### **Turnout Time**

Turnout time is defined as the ***period of time*** that it takes for response personnel to discontinue the activities that they are engaged in, properly attire themselves, and board the vehicle in readiness for response. Turnout time shall include the elapsed time between notification alert of an emergency event in progress and the emergency vehicle actually beginning to respond to the identified address or location.

The Sierra Fire District requires all personnel to be fully dressed for the dispatched event prior to entering the response vehicle and responding. The Sierra Fire District has two completely different protective clothing scenarios: one for structural firefighting, and vehicle extrication, and one for wildland firefighting. The nationally recognized benchmark is 60 seconds.

### **Travel Time**

Travel time is defined as the ***period of time*** between the vehicles beginning their ***uninterrupted*** response and the actual time that the emergency response vehicle arrives at the address or location to which it has been dispatched. Travel time includes driving distance and delays caused by misinformation in the dispatch, traffic obstruction and/or geographical obstacles. Travel time ends when the vehicle is declared on-scene by the first arriving unit officer. The national response standard is based on 35-mpg average or 53.1 feet/second.

## On-Scene Time

On-scene time is defined as the **point in time** that the first due responding emergency vehicle or responsible command officer arrives at the scene of an emergency and begins to take immediate action or take command of the rest of the response force. On-scene time is only accurate if the officer or individual in charge is in a position to actually begin to assess the nature of the emergency. Generally speaking, this is the same as the stoppage of the vehicle, but may be extended in the event of extremely large area buildings, wildland events that are significantly off the road, mid-rise and/or circumstances in which the original address was inaccurate requiring additional travel time.

## Initiation of Action

This is defined as the **period of time** of actual involvement by the individual crewmembers or company in the reduction of the state of emergency at the scene. It is an indication of total commitment at the scene. This period is not terminated until such time as the fire officer or other individual with jurisdiction determines that the organized fire unit can be placed back in service and/or respond to an additional emergency.

Some fire agencies declare a unit as “in Service” but keep it on the scene for further activity. For purposes of defining fire service activity levels, a company is not to be considered to be free of an emergency until allowed to leave the scene.

*Sierra FPD does not have minimum company standards that would define typical fireground tasks and assign a minimum time frame to that evolution. Since each fire station has a crew that works on the A-B-C shifts each crews time to perform a standard function could vary. An Incident Commander would have no reliable time frame in mind to deploy specific tactics to a fire event. Diamante is unable to evaluate the initiation of action component of the Standards of Cover document. Sierra FPD has a goal to incorporate this missing element*

## Termination of the Incident

This is defined as the time when an event is declared terminated and all deployed agency resources are available for another assignment. The period of time between arrival and availability for response is measured by the factor of response reliability.

## Total Response Time

Total response time is calculated from the time point at which the alarm is reported (notification) to the time point when units arrive at the emergency event (on scene).

If a state of normalcy exists, there is no need to call emergency services to the scene. However, once an event initiation begins and the cascade of events begins to unfold, the degree of loss of life and property that can be prevented may be impacted by the passage of time.

For purposes of this coverage document, response time is a compilation of the elements beginning with alarm processing time up to on scene time. It has three elements:

1. Alarm processing time
2. Turnout time

### 3. Travel time

Therefore, for purposes of definition and the need to establish a common benchmark for purposes of evaluating response time accreditation criteria, the following times should be made available and used in defining base line norms for a candidate agency:

Response Time -

- A. Notification/Alarm Processing = 60 second benchmark
- B. Turnout Time = 60 second benchmark
- C. Travel Time =

General Rural	Fire- EMS Response	18 + Minute Response Time*
Rural Lands	Fire- EMS Response	8-18 Minute Response Time*
Suburban Lands	Fire- EMS Response	3-8 Minute Response Time*
Urban Lands	Fire –EMS Response	3 Minute Response Time*

\*Time adjusted for Notification/Alarm Processing and Turnout Time

\*Time adjusted for Notification/Alarm Processing and Turnout Time

Total Response Time = A + B + C

*SFPD utilizes the services of ECOMM for its dispatch services. The largest flaw within the system is that the time stamp criteria does not divide the incident into hundreds of a second. An example is that at each dispatch milestone (receipt of call, dispatch of call, units arrival at scene etc. there could be up to a 59 second error on each time stamp. For example if the call comes in at 14:02 PM, it could actually come in at 14:02:01 PM or 14:02:59 PM offering up to :59 second error at every time stamp. A total response could be significantly altered based upon this information. Since this is one of the very few written Service Level Objectives established by the Board of County Commissioners. That coupled with average response times, rather than fractile response times does not allow for an accurate accounting of fire district operations.*

### Deployment – Distribution and Concentration

Deployment is measured and typified from two concepts, which are influenced by response time and create an effective response force for *each risk category*:

- **Distribution:** The locating of geographically distributed, first-due resources, for all-risk initial intervention. These station locations(s) are needed to assure rapid deployment to minimize and terminate average, routine emergencies.

Distribution is measured by the percentage of the jurisdiction covered by the first-due units within ***adopted public policy response times***. Policies shall include “benchmarks” for intervention such as: arrival prior to or at flashover; arrival on EMS incidents prior to brain death in cardiac arrest. From risk assessment and benchmark comparisons, the jurisdiction will use critical task analysis to identify needed resource distribution and staffing patterns.

A sample distribution policy statement could be:

*"For 90% or 4 minute response time of all incidents, the first-due unit shall arrive within six minutes total reflex time. The first-due unit shall be capable of advancing the first line for fire control or starting rescue or providing basic life support for medical incidents."*

#### Deployment Evaluation for the Sierra Fire Protection District

There are three National Fire Protection Association (NFPA) standards that contain time requirements that influence the delivery of fire and emergency medical services. These are NFPA 1221, Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems; NFPA 1710, Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments; and NFPA 1720, Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments.

NFPA 1710 contains time objectives that shall be established by career fire departments as follows:

- Turnout time: One minute (60 seconds) for turnout time
- Fire response time: Four minutes (240 seconds) or less for the arrival of the first arriving engine company at a fire suppression incident and/or eight minutes (480 seconds) or less for the deployment of a full first alarm assignment at a fire suppression incident
- First responder or higher emergency medical response time: Four minutes (240 seconds) or less for the arrival of a unit with first responder or higher-level capability at an emergency medical incident
- Advanced life support response time: Eight minutes (480 seconds) or less for the arrival of an advanced life support unit at an emergency medical incident, where the service is provided by the fire department

The standard states that the fire department shall establish a performance objective of not less than 90 percent for the achievement of each response time objective. NFPA 1710 does contain a time objective for dispatch time by requiring that "All communications facilities, equipment, staffing, and operating procedures shall comply with NFPA 1221."

*It is highly unlikely that Sierra Fire Protection District meets the response criteria as established in NFPA 1710, the recommendation for Fractile response times would greatly help in this evaluation.*

For the purposes of NFPA 1710, the following definitions apply:

- Dispatch time: The point of receipt of the emergency alarm at the public safety answering point to the point where sufficient information is known to the dispatcher and applicable units

are notified of the emergency

- Turnout time: The time that begins when units acknowledge notification of the emergency to the beginning point of response time
- Response time: The time that begins when units are en route to the emergency incident and ends when units arrive at the scene

NFPA 1720 contains a time objective for dispatch time by requiring that “All communications facilities, equipment, staffing, and operating procedures shall comply with NFPA 1221, Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems.” NFPA 1720 contains no time requirements for turnout and response times.

NFPA 1221 requires that 95 percent of alarms shall be answered within 15 seconds, 99 percent of alarms shall be answered in 40 seconds, and the dispatch of the emergency response agency shall be completed within 60 seconds 95 percent of the time. The time lines for dispatching shown in figures 7 and 8 are taken from NFPA 1221:

- After the receipt of a call for assistance, the fire department will respond with the first unit to that location within three minutes.
- After receipt of a call for assistance, the fire department will respond with a unit to that location, within four minutes, to 90 percent of area served.
- After receipt of a call for a medical emergency, the fire department will respond with an engine company to that location within four minutes and an ambulance within six minutes.

The Insurance Services Office (ISO) recommends that the first due engine company should be located within 1.5 miles of major built up areas.

*Sierra Fire Protection District does not have first due engine companies locate 1.5 miles from major built up areas.*

The following chart depicts the distance of Sierra Fire Protection District Fire Stations from each other, Station 30 was used as the base location. This includes both paid and volunteer stations. The use of volunteer stations for consistent planning cannot be relied upon based on the availability and training of the volunteers

<b>Fire Station Number</b>	<b>Distance from Station 30</b>
Station 30- Paid	Zero
Station 301-Volunteer	5.66 miles
Station 321-Volunteer	35.59 miles
Station 331-Volunteer	31.07 miles
Station 35- Paid	31.03 miles
Station 38-Paid	15.40 miles
Station 381	14.93 miles

Source: Mileage is estimated based on MapQuest website information



### Sierra Fire Protection District Future Fire Stations

Many factors can cause a fire department not to meet its response time goal (as established by the Board of County Commissioners). These might include, but are not limited to the following:

- Extremely heavy traffic patterns during specific periods of time.
- Concurrent alarms that result in engine companies having to come out of district more often than they should to provide first response into another district.
- Seasonal weather conditions.
- Specific community events that have a negative impact on the availability of a fire company to meet its response time goals.

This analysis leads to a series of potential thresholds. The factors that are being evaluated to mitigate the problem could be such things as:

- Adding an additional fire station;
- Outfitting a second company in an existing fire station;
- Requiring improvements in the road transportation network; and
- The inclusion of traffic expediting devices such as signal control by the fire service and emergency services.

Then it is also conceivable that you could minimize risk by requiring built-in fire protection in those areas that are beyond the travel distances established by the Board of County Commissioners or the actual response times that cannot currently accurately be evaluated. The single and multi-family occupancy is the primary occupancy for the loss of life and property according to the United States Fire Administration. Therefore, any time there is a concentration of single family and/or multi-family dwellings in which there is a sense of community, there is an expectation of fire service levels being consistent with the level of service throughout the remainder of the community, this is a difficult task in a non-urban or suburban environment.

It is obvious that Sierra Fire Protection District could easily add at least two more fire stations to improve its response times. The question really is about acceptable risk, does the cost of a fire station and its staffing affordable to the constituents of the Sierra Fire Protection District? Our analysis based upon response times and value and population would indicate that the Arrowcreek/Thomas Creek area needs a paid fire station. A sample emergency response run from the closest fire station, SFPD Station 38 to the Clubhouse located at 2905 Arrow Creek Parkway shows the distance to be 5.19 miles. A fire station sited in that area would improve overall response times and also improve the concentration described below for the entire Sierra Fire Protection District. The lack of a fire station in the Arrowcreek/Thomas Creek area was also noted in the “Washoe County, Nevada Description of Fire Service Deployment Assets, March 2008 Emergency Services Consulting, Inc” study.

- **Concentration:** the spacing of multiple resources arranged (close enough together) so that an “effective response force” can be assembled on-scene within *adopted public policy* time frames. An “initial” effective response force is that which will most likely stop the escalation of the emergency for each risk type.



- o Concentration is measured by risk category type - high-risk areas need second and third due units in shorter time frames than in typical or low risk areas.

Concentration pushes and pulls distribution and there is no one perfect mathematical solution. Each agency after risk assessment and critical task analysis has to be able to quantify and articulate why its resource allocation methodology meets the governing body's adopted policies for initial effective intervention on both a first-due and multiple unit basis.

The Following Charts will Show the Closest Paid Fire Stations to each Sierra Fire Protection District Paid Station.

#### SFPD Station 30

<b>Closest Fire Agency Station</b>	<b>Distance in Miles</b>
Reno/TM Station 16	5.24 miles
Sierra Fire Station 38	15.40 miles
Reno/TM Station 14	11.69 miles

#### SPFD Station 35

<b>Closest Fire Agency Station</b>	<b>Distance in Miles</b>
Reno Station 11	5.16 miles
Reno Station 19	7.94 miles
Reno Station 5	8.46 miles
Reno Station 7	10.69 miles

#### SPFD Station 38

<b>Closest Fire Agency Station</b>	<b>Distance in Miles</b>
Reno/TM Station 14	6.85 miles
Reno/TM Station 16	12.87 miles
Sierra Fire Station 30	15.40 miles

It is obvious from the distances from each location that is very difficult for Sierra Fire Protection District to consistently deliver the personnel and equipment to the scene of an emergency that requires multiple units and conduct safe and efficient firefighting operations.

### Performance and Reliability

How reliable is your response system, does the agency frequently see multiple calls for service (stacked, or queued calls) and do these degrade performance? Are there predictable times of the day, week or year when queued calls occur? Can these occurrences be controlled or can peak hour staffing be used?

*Sierra Fire does not track second or third calls in a each station response area. The lack of this information does not allow Diamante to evaluate performance and reliability. This is a critical flaw of the data system and should be corrected.*

## National Rating Systems

### Insurance Services Office

Insurance companies were the driving force in fire protection in the early 1800's. Insurance companies would issue to subscribers metal identification marks to be placed on the homeowners' dwelling, these marks served to notify fire companies that the dwelling was insured. Great fires in the 1800's were the rule rather than the exception. In the event of a fire, the first arriving fire company would be compensated for salvaging the belongings of the insured party. This system often led to general disruption at the scene of an emergency and often contributed to conflagrations.

The National board of Fire Underwriters was an organization that was concerned about the large fire loss and conflagration hazards in the 1800s. The NBFU began to survey large cities for its members to identify why large-loss fires in cities were occurring and how they might be prevented. In their surveys, they noted building conditions, fire department equipment and staffing, firefighting water supplies and other fire protection factors. When all of the material was put together from these surveys, it formed the embryo of today's Insurance Services Office ratings. Today's document is now known as "Standard Grading for Grading Cities, and Towns of the United States with Reference to their Fire Defenses and Physical Conditions". This "Grading Schedule" became one of the criteria by which insurance companies determine fire insurance rates for any given city or town. The Insurance Services Office continued to refine this process which is still in use today. ISO field engineers. These engineers examine and grade water supply, fire department equipment, operations, staffing, training, fire prevention, fire communications, building and code enforcement, building conditions, conflagration protection and records and reports. Each of the areas noted are given a maximum number of potential deficiency points. Large cities are only assessed on their fire loss in any year, smaller jurisdictions like the Sierra Fire Protection District are subjected to in-depth analysis by field engineers.

### Relative Values and Maximum Deficiency Points

Feature	Percent	Points
Water Supply	39%	1950
Fire District	39%	1950
Fire Service Communications	9%	450
Fire Safety Control	13%	650

### Relative Grading of Municipalities in Fire Defenses and Physical Conditions Points of Deficiency Class of Municipality

0-500	Class 1
501-1000	Class 2
1001-1500	Class 3

1501-2000	Class 4
2001-2500	Class 5
2501-3000	Class 6
3001-3500	Class 7
3501-4000	Class 8
4001-4500	Class 9
More than 4500	Class 10

The ISO provides a fire defense grading to insure that Cities are not prone to large loss conflagrations. Insurance companies base their rates on these grades, consistent with State insurance regulations. This is one form of analysis of a fire department, but one that does not consider the many other important components of a fire and life safety system. ISO does not grade emergency medical services, response to hazardous material incidents or disaster preparedness. This system of evaluating a fire department solely on its fire suppression capabilities has lost credibility with members of the International City Managers Association, the International Fire Chief's Association and many related professional fire service groups.

*The highest grade a fire department can receive from the Insurance Services Office is a 1. Currently Sierra Fire Protection District has a rating of 5 in areas that have fire hydrants, and Sierra Fire Protection District has a rating of 8 in areas that do not have fire hydrants.*

## Reference

Insurance Services Office

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) 1710

Origin and Development of NFPA 1710

The development of this standard adopted in 2000 was the result of a considerable amount of work over several years by the technical committee members appointed by NFPA representing several fire and governmental organizations. In the case of this standard, their work is the first organized approach to developing a standard, defining levels of service, deployment capabilities, and staffing levels for those "substantially" career fire departments. Research work and empirical studies in North America were used by the committee as a basis for developing response times and resource capabilities for those services being provided, as identified by the fire service. NFPA 1710 provides the user with a template for developing an implementation plan in respect to the standard. The NFPA 1710 standard set forth in concise terms the recommended resource requirements for fires, emergencies, and other incidents. The standard is currently in a review cycle and changes may occur in the standard, effective in 2009.

There are three levels of EMS provision recognized in the NFPA 1710 standard:

1. First responder with automatic external defibrillator (AED)

## 2. Basic life support (BLS)

## 3. Advanced life support (ALS)

The standard also recognizes EMS transport as a service that may be provided by the fire department. It is not a requirement that a fire department provide all levels of EMS service beyond first responder (AED). However, the standard establishes operational requirements for each level provided by a department. For each level operational requirements are set forth as follows:

a) First Responder (AED)—A fire department must appropriately train all response personnel at the first responder with AED capability level and personnel must arrive within a four-minute response timeframe to 90 percent of all emergency medical incidents. The number of personnel must be sufficient to assure adequate care capability and member safety.

b) BLS—A fire department providing BLS beyond the first responder level shall adhere to staffing and training requirements as set forth by the state or provincial licensing agency. The department must also deploy sufficient mobile resources to arrive within a four-minute response timeframe for 90 percent of all incidents.

c) ALS—A fire department that provides ALS beyond the first responder and BLS levels shall adhere to staffing and training requirements as set forth by the state or provincial licensing agency. The department must also deploy sufficient mobile resources to arrive within an eight minute response timeframe for 90 percent of all incidents.

*Sierra Fire Protections Districts decision to provide engine based paramedics serves the greatest volume of calls and assist with the long response times by REMSA.*

## Special Challenges and Wildland Operations

The fire department is required to formally define the types of special operations required or expected to be performed in an emergency or other incident. These types of special operations include, but are not limited to, hazardous materials response, confined space response, technical rescue, high-angle rescue, and water rescue. Regardless of the fire department's defined special operation capability, all firefighters who provide emergency response must be trained to the first responder operations level for both hazardous materials and confined space responses. Likewise, all fire departments must define their response capability to natural disasters, terrorism incidents, large-scale emergencies, and mass casualty events.

The Sierra Fire Protection District has established that they will rely on Reno/TM fire for a variety of special operations including hazardous material response, urban search and rescue and water rescue operations. Additionally, it must have the capacity to initiate a rapid intervention crew during any and all special operations responses.

The NFPA 1710 standard recognizes many, if not most, fire departments must respond to either wildland or wildland/urban interface fires. Accordingly, the fire department must address the service delivery for such occurrences. The standard specifies the minimum wildland staffing for defined wildland companies, as well as engine companies that respond to wildland or urban interface/wildland emergencies. Likewise, deployment requirements for a wildland initial direct attack are specified. Sierra Fire Protection District is well suited to respond to initial Wildland fires, and is well versed in bringing in outside resources to combat these fires.

A system is a functionally-related group of components. These are areas where a set of needs or requirements work closely together and are interrelated to achieve a key result. The NFPA 1710 standard addresses five of these systems.

- **Safety and Health**—Each organization must have an occupational safety and health program meeting the requirements of NFPA 1500, Standard on Fire Department Occupational Safety and Health Program
- **Incident Management**—Each organization must have in place an incident management system designed to handle expected incidents. The system must be in accordance with NFPA 1561, Standard on Emergency Services Incident Management System.
- **Training**—Each organization must ensure members are trained to execute all responsibilities consistent with its organizational statement. This training must be accomplished using a programmatic approach that includes a policy.
- **Communications**—Each organization must have a communications system characterized by:
  - o Reliability
  - o Promptness
  - o Standard operating procedures, terminology and protocols

Departments must also comply with all the requirements set forth in NFPA 1221, Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems.

- **Pre-Incident Planning**—Safe and effective operations are grounded in identifying key and high hazard targets. The standard requires departments to develop operational requirements to obtain information regarding these locations.

Together, these five systems help to ensure emergency responders have the essential tools, information, procedures, and safeguards to operate effectively and efficiently.

National Standard	Evaluation of Sierra FPD 1710 Compliance
Safety and Health	Does not currently meet standards, Being developed as the plan is being written
Incident Management	Meets Standard
Training	Meets Standard
Communications	Meets Standard
Pre-Incident Planning	Meets Standard

## RESPONSE RELIABILITY

Response reliability is defined as the probability that the required amount of staffing and apparatus will be available when a fire or emergency call is received. The response reliability of the fire department would be 100 percent if every piece of its apparatus were available every time an emergency call was received. In reality, there are times when a call is received for a particular company but the company is already on another call. This requires a substitute (second-due) company to be assigned from another station. As the number of emergency calls per day increases, so does the probability that a needed piece of apparatus will already be busy when a call is received. Consequently,

the response reliability of the fire department for that company decreases, which will have an impact on department travel times to emergencies. The size of the area that a station covers, the number of calls, the types of calls, and the population density all affect response reliability. The more densely populated, the more likely a second-due call will occur. An analysis of current response data can reveal variations in the response reliability among stations. The optimal way to track response reliability would be to analyze the total call volume for a particular fire management area and then track the number of double and triple calls to assess what the true response reliability is for that given area and the companies assigned to respond into the area.

Service level goals are established based upon federal and state legislation, such as 2 In/2 Out, federal and state OSHA requirements, ISO grading schedule, national standards such as the one developed by the NFPA and best practices found in the CFAI agency accreditation process.

*The service level goals identified for the SFPD are based upon the events the fire department is called to respond to (types of calls- fires, and medical emergencies) and the service provided by the fire department. These service goals are the benchmark of performance in respect to travel times (response criteria developed by Board of County Commissioners), but do not measure other aspects of performance. This should be corrected and reported quarterly to the Board of Commissioners.*

## **Overall Evaluation**

The Sierra Fire Protection District grew from a Wildland only response to what would be considered an all risk fire department. The significant issues that faces the Sierra Fire Protection District include lack of funding, annexation policies, the great distances from fire station to fire station and the lack of economy of scale. Sierra Fire Protection District needs the assistance of either Reno or Truckee Meadows Fire Protection District to accomplish its Firefighting and Specialized Rescue responses. Sierra Fire Protection District should not be a stand alone fire agency, but rather enter into an Interlocal Agreement with Truckee Meadows/Reno Fire Departments. This would allow for a comprehensive Fire Station Location Study to determine where to relocated existing system stations and best serve the community.

## **Challenges facing the SFPD**

The District's geographical configuration results in poorly located and inadequately funded fire stations to meet current service demands. It costs an average of \$2.1 million to fully fund a staffed fire station. The majority of District tax revenue (\$4,808,583) comes from the Galena area, which has one station and needs a second station in the Thomas Creek/Arrowcreek area.

The District has a staffed fire station in Verdi providing service to an area that produces \$841,490 in revenue and responds 58% of the time to the City of Reno. Arguably, the Galena area is subsidizing the Verdi station by \$1,258,500 per year.

The Washoe Valley station responds 74.6% of the time to the TMFPD area. The Washoe Valley area produces \$320,169 in annual revenue. Again it can be said the Galena area subsidizes the Washoe Valley area by \$1,779,831 per year.

The District does not own the Bowers Mansion, Galena or the Verdi Fire Stations. The only station owned by the District is the Joy Lake Station and the Peavine Vounteer Fire Department Station.

The District needs to build and staff a fire station in the Arrowcreek/Thomas Creek area to provide response times consistent with the other areas of the District.

The District has been significantly impacted by annexation. The District continues to have a significant wildland risk.

The District was originally managed by the NDF Western Region and State Offices. When the District was transferred to County control, the District added two employees: a Fire Chief and Administrative Secretary. This leaves the District with limited administrative staff.

The District does not use Fractile Response Time, which does not allow the District to analysis the services it provides in a factual manner

The District does not track their emergency incidents to Census Tract areas, therefore missing out of the opportunity to track fire and life safety trends.

The District cannot run a full first alarm assignment for a structure fire or Wildland incident without the assistance of Reno or Truckee Meadows Fire.

The District does not have the tools, equipment or training to respond to specialized emergencies and relies heavily on Reno and Truckee Meadows Fire.

The District depends on the North Lake Tahoe Fire Protection District to protect District lands on the East shore of Lake Tahoe.

The District employees are dedicated individuals committed to providing their best efforts to the citizens of the Fire District.

The District current fire stations are not placed for optimal coverage of District residents and were originally sited for forest fire operations.

The District runs a very effective fuels reduction crew.

The District has not established Goals, Objectives or Benchmarks to evaluate fire and life safety systems.

The District should align its Volunteer Fire Department Programs to match existing boundaries.